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Editor Dr Milica Vlahović

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FOREWORD

The conditions created by the development of technologies in which modern man lives have led to a complex and paradoxical effect: that by removing obstacles on the way to a more comfortable, simpler, faster and more efficient life and way of working, man also generates numerous misfortunes, attracting dark clouds of threats to the survival of the planet and humanity. The question that concerns and affects all of us - all people, all living beings, systems in which life takes place, large and small, strong and weak - boils down to the problem of the negative impact of man on the environment; this issue invites us to an urgent solution by looking at the causes, proposing solutions, evaluating them, changing approaches and ways of thinking, as well as drawing correct conclusions. Simply put, by adapting nature to one's own needs, man threatens and damages it. That is why, with the joint efforts of all of us, individuals, organizations and states, it is necessary to take all possible measures to immediately prevent the negative effects that are ahead of us.

The importance of renewable sources of electricity, which this international conference focuses on, is noticeable from two angles: the first - it is certain that fossil fuels as a resource will disappear and it is necessary to find alternative sources, the second - the use of renewable energy sources by its essence implies "clean" technology that significantly contributes to reducing CO₂ emissions and thus mitigating climate change and reducing pollution, while encouraging social and economic development in all spheres of life.

The 11th International Conference on Renewable Electrical Power Sources is organized by the Society for Renewable Electrical Power Sources (DOIEE) at SMEITS, with co-organizers: The Institute of Architecture and Urban & Spatial Planning of Serbia (IAUS) and the Chamber of Commerce and Industry of Serbia, with the support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.

The registered participants designed their papers according to the given conference topics:

- Energy sources and energy storage;*
- Energy efficiency in the context of use of renewable energy sources (RES);*
- Environment, sustainability and policy;*
- Applications and services.*

Eminent authors - scientists, teachers, experts in this field from fifteen different countries: Algeria, Belgium, Bosnia and Herzegovina, China, Croatia, Greece, Hungary, India, Portugal, Saudi Arabia, Serbia, Slovenia, Spain, the United Arab Emirates, and Ukraine, contributed to the conference through sixty-nine papers that were reviewed by the Scientific Committee of the Conference, and after the review process were accepted for presentation at the conference and for publication in the proceedings.

At the end of this short message and at the beginning of the proceedings I believe that it can be proudly said that scientists, researchers, policy makers and industry experts gathered in one place, in order to exchange experiences and knowledge with the aim of promoting scientific and professional ideas and results of research, technology improvement for the use of RES, promoting the rational use of electricity, affirming and proposing inventive solutions in the field of sustainable sources of electricity.

*Belgrade,
November 2023*

Milica Vlahović

SADRŽAJ / CONTENTS

Plenarna predavanja:

- 1. IZAZOVI U ELEKTROHEMIJSKOM SKLADIŠTENJU**
ENERGIJE CHALLENGES IN THE ELECTROCHEMICAL ENERGY STORAGE
Branimir N. GRGUR..... 1
- 2. POLIANILIN: PROVODNI POLIMER U UREĐAJIMA ZA SKLADIŠTENJE ENERGIJE**
POLYANILINE: CONDUCTIVE POLYMER IN ENERGY STORAGE SYSTEMS
Aleksandra JANOSEVIC LEZAIC 11
- 3. ISPITIVANJE KVALITETA EKSPLOZIVNO ZAVAREN OG SPOJA RAZNORODNIH METALA ZA
POTENCIJALNU PRIMENU U OBNOVLJIVIM IZVORIMA ENERGIJE**
TESTING THE QUALITY OF EXPLOSIVELY WELDED JOINTS OF DISSIMILAR METALS
POTENTIALLY APPLICABLE IN RENEWABLE ENERGY SOURCES
Ana ALIL, Milos LAZAREVIC, Danica BAJIC, Nada ILIC, Tihomir KOVACEVIC, Bogdan NEDIC..... 23
- 4. METODE BEZ RAZARANJA I UNAPREĐENJE POUZDANOSTI RADA KULE ZA HLAĐENJE,
KAO ASPEKT TEMATIZACIJE OBNOVLJIVIH IZVORA ENERGIJE**
NON-DESTRUCTIVE METHODS AND IMPROVEMENT OF THE COOLING TOWER OPERATION
RELIABILITY, AS AN ASPECT OF RENEWABLE ENERGY SOURCES THEMATIZATION
Marko JARIC, Sanja PETRONIC, Nikola BUDIMIR, Zoran STEVIC, Suzana POLIC..... 35

Energetski izvori i skladištenje energije:

- 1. ELEKTRIČNA SVOJSTVA TANKIH FILMOVA GO I GO/WPA NA
INTERDIGITALNIM ELEKTRODAMA**
ELECTRICAL PROPERTIES OF GO AND GO/WPA THIN FILMS
ON INTERDIGITAL ELECTRODES
Zeljko MRAVIK, Milica PEJCIC, Sonja JOVANOVIC, Darija PETKOVIC,
Misa STEVIC, Zoran STEVIC, Zoran JOVANOVIC..... 45
- 2. MODELOVANJE I SIMULACIJA UREĐAJA ZA NAVODNJAVANJE KAP-PO-KAP**
MODELING AND SIMULATION OF A DEVICE APPLIED FOR LOW-FLOW DRIP IRRIGATION
Nouredine BENSEDIRA, Abdessmad MILLES, Mohammed-Salah AGGOUNE 53
- 3. UTICAJ SENKE USLED DENIVELACIJE KROVA NA PROIZVODNJU KROVNE SOLARNE ELEKTRANE
IZLAZNE SNAGE 400KW**
THE INFLUENCE OF THE SHADOW CAUSED BY THE SLOPE OF THE ROOF ON THE
PRODUCTION OF A ROOF-TOP SOLAR POWER PLANT WITH AN OUTPUT POWER OF 400KW
Marko S. DJUROVIC, Zeljko V. DESPOTOVIC 61

4. PROJEKTOVANJE I IZVOĐENJE SOLARNE ELEKTRANE IZLAZNE SNAGE 400KW NA KROVU FABRIČKE HALE "EP BELT"-LOZNICA	
DESIGN AND REALISATION PV ROOF-TOP POWER PLANT 400KW IN THE FACTORY "EP BELT"-LOZNICA	
Zeljko V. DESPOTOVIC, Marko S. DJUROVIC	67
5. PRENAMENA NAPUŠTENIH ILI STARIH NAFTNIH POLJA ZA IZGRADNJU GEOTERMALNIH ELEKTRANA	
THE CONVERSION OF ABANDONED OR MATURE OIL FIELDS INTO GEOTHERMAL POWER PLANT LOCATIONS	
Ivan RAJSL, Sara RAOS	79
6. POBOLJŠANJE SPOSOBNOSTI SAMOIZLEČIVANJA I ŽILAVOSTI MIKROKAPSULA SA TUNG ULJEM DODATKOM GRAFENSKIH NANOPLOCICA I NJIHOVA PRIMENA U EPOKSI SISTEMU	
THE IMPROVEMENT OF SELF-HEALING CAPABILITY AND TOUGHNESS OF MICROCAPSULES WITH TUNG OIL BY THE ADDITION OF GRAPHENE NANOPATELETS AND THEIR APPLICATIONS IN EPOXY SYSTEM	
Natasa TOMIC, Abdullah MUSTAPHA, Maitha ALMHEIRI, Mohamed Nasr SALEH	87
7. MODEL SOLARNOG PANELA SA SOLARNIM TRAGAČEM, UPRAVLJAN POMOĆU ARDUINO UNO MODULA	
MODEL OF THE SOLAR PANEL WITH SOLAR TRACKER CONTROLLED BY THE ARDUINO UNO BOARD	
Ivan TODORIC, Djordje DIHOVICNI, Dragan KRECULJ, Sanja JEVTIC, Nada RATKOVIC KOVACEVIC	93
8. TERMoeLEKTRIČNI EFEKAT KAO IZVOR ENERGIJE U PRUŽNIM ŽELEZNIČKIM APLIKACIJAMA	
THERMOELECTRIC EFFECT AS A SOURCE OF ENERGY IN RAILWAY TRACKSIDE APPLICATIONS	
Sanja JEVTIC, Milesa SREČKOVIĆ, Dragan KRECULJ, Nada RATKOVIĆ KOVACEVIC.....	101
9. POREĐENJE RAZNOVRNIH TIPOVA ENERGIJE OD POKRETNIH VODA	
COMPARISON OF VARIOUS TYPES OF ENERGY FROM MOVING WATERS	
Djordje DIHOVICNI, Dragan KRECULJ, Olga JAKSIC, Nada RATKOVIC KOVACEVIC	107
10. ISPITIVANJE LIF/B SISTEMA KORIŠĆENJEM NEGATIVNOG MODA LDI MS: MOGUĆI SISTEM ZA SKLADIŠTENJE VODONIKA	
INVESTIGATION OF LIF/B SYSTEM USING THE NEGATIVE MODE LDI MS: A POSSIBLE HYDROGEN STORAGE SYSTEM	
Filip VELJKOVIC, Bojan JANKOVIC, Ivana STAJCIC, Milovan STOJILJKOVIC, Marija JANKOVIC, Djordje KAPURAN, Suzana VELICKOVIC	115
11. UŠTEDA ENERGIJE PRILIKOM ELEKTROLITIČKOG DOBIJANJA VODONIKA-POREĐENJE DVOKOMPONENTNIH I TROKOMPONENTNIH JONSKIH AKTIVATORA	
ENERGY SAVINGS IN ELECTROLYTIC HYDROGEN PRODUCTION – COMPARISON OF BINARY AND TERNARY ACTIVATORS	
Sladjana MASLOVARA, Dragana VASIC ANICIJEVIC, Snezana BRKOVIC, Vladimir NIKOLIC, Milica MARCETA.....	119

12. KINETIKA TERMALNE DEGRADACIJE LIGNOCELULOZNOG OTPADA NA BAZI KOŠTICA BRESKVE THERMAL DEGRADATION KINETICS OF LIGNOCELLULOSIC PEACH STONE WASTE Zorica LOPIČIĆ, Anja ANTANASKOVIĆ, Slobodan CVETKOVIC, Vladimir ADAMOVIĆ, Tatjana SOSTARIC, Jelena AVDALOVIC, Mirjana KIJEVCANIN	125
13. THERMAL PROPERTIES OF RAPIDLY SOLIDIFIED Cu-Al-Ni-Mn SHAPE MEMORY ALLOY Borut KOSEC , Milan BIZJAK, Mirko GOJIC, Ales NAGODE, Ivana IVANIC, Blaž KARPE	133
14. PROCENA POTENCIJALA POLJOPRIVREDNO-FOTONAPONSKIH SISTEMA U SRBIJI ASSESSMENT OF THE AGRIVOLTAIC POTENTIAL IN SERBIA Aleksandar IVANCIC, Melita ROGELJ, Bora OBRADOVIC, Slaviša JELISIC.....	139

Energetska efikasnost u kontekstu primene RES:

1. ULOGA KUPCA-PROIZVOĐAČA (PROZJUMERA) U PRIMENI OIEE U SRBIJI: PRE-PREKE I MOGUĆNOSTI THE ROLE OF THE BUYER-PRODUCER (PROSUMER) IN THE IMPLEMENTATION OF RES IN SERBIA: OBSTACLES AND OPPORTUNITIES Marina NENKOVIC-RIZNIC, Borjan BRANKOV, Mila PUCAR, Ana STANOJEVIC.....	147
2. PRIMENA SERIJSKE VEZE KOMPONENTI FREKVENTNO ZAVISNIH KOMPONENTI ISTOG TIPA U SISTEMIMA SA OBNOVLJIVIM IZVORIMA ENERGIJE APPLICATION OF A SERIES CONNECTION OF THE SAME TYPE BANDPASS FREQUENCY DEPENDENT COMPONENTS IN SYSTEMS WITH RENEWABLE ENERGY SOURCES Tykhon SYTNIKOV, Igor PEREKRESTOV, Andrey CHMELECKSKY, Pavlo STUPEN, Valerii SYTNIKOV.....	159
3. SMANJENJE GUBITAKA U DISTRIBUTIVNOJ MREŽI UVAŽAVAJUĆI NESIGURNOST SNAGE OPTEREĆENJA I DISTRIBUIRANE PROIZVODNJE IZ OBNOVLJIVIH IZVORA REDUCTION OF LOSSES IN THE DISTRIBUTION NETWORK CONSIDERING THE UNCERTAINTY OF LOAD AND RENEWABLE DISTRIBUTED GENERATION POWER Nikola KRSTIC, Dragan TASIC, Teodora DENIC.....	165
4. TEHNOLOGIJE ZA PRAĆENJE POLJOPRIVREDNIH ZASADA POMOĆU BESPILOTNIH LETILICA TECHNOLOGIES FOR MONITORING AGRICULTURAL CROPS USING UAV Njegos DRAGOVIC, Milovan VUKOVIC, Snezana UROSEVIC	173
5. MIKRO STEP ELEKTROMOTORNI POGON KONTROLISAN MIKROKONTROLEROM MICRO STEP ELECTRIC DRIVE CONTROLLED BY MICROCONTROLLER Misa STEVIC, Zoran STEVIC, Predrag STOLIC, Ilija RADOVANOVIC, Dejan ILIC, Zoran JOVANOVIĆ.....	181
6. SMART MATERIJALI I SAVREMENI KONTEKST ZA FUNKCIONALIZACIJU OBNOVLJIVIH IZVORA ENERGIJE U GALERIJSKOM PROSTORU SMART MATERIALS AND CONTEMPORARY CONTEXT FOR THE FUNCTIONALIZATION OF RENEWABLE ENERGY SOURCES IN THE GALLERY SPACE Suzana POLIC, Sanja PETRONIC, Marko JARIC.....	185

7. BLOCKCHAIN I RANE VIZUELIZACIJE KORIŠĆENJA ENERGIJE VETRA U MUZEJSKIM KOLEKCIJAMA	
BLOCKCHAIN AND EARLY VISUALIZATION OF THE USE OF WIND ENERGY IN MUSEUMS COLLECTIONS	
Suzana POLIC	195
8. ENERGETSKA EFIKASNOST U ELEKTRIČNIM VOZILIMA – PREGLED	
ENERGY EFFICIENCY IN ELECTRIC VEHICLES – AN OVERVIEW	
Zoran STEVIC, Ilija RADOVANOVIĆ, Predrag STOLIC, Sanja PETRONIC, Marko JARIC, Misa STEVIC, Dejan ILIC.....	203
9. TOPOLOGIJE NEIZOLOVANIH DC-DC KONVERTORA SA POBOLJŠANIM KARAKTERISTIKAMA	
NON-ISOLATED DC-DC CONVERTERS TOPOLOGIES WITH IMPROVED CHARACTERISTICS	
Oleksii YAMA, Zoran STEVIC, Oleksandr BONDARENKO	209
10. MOGUĆNOST PRIMENE ULTRAZVUČNE KAVITACIJE U PROCESU PRERADE INDUSTRIJSKIH OTPADNIH VODA	
POSSIBILITY OF USING ULTRASONIC CAVITATION IN THE PROCESS OF INDUSTRIAL WASTEWATER TREATMENT	
Sladjana JEZDIMIROVIC, Marina DOJCINOVIC	219
11. ZNAČAJ DISTRIBUCIJE TOPLOTE U SAVREMENIM ENERGETSKI EFIKASNIM ELEKTRIČNIM VOZILIMA	
IMPORTANCE OF HEAT DISTRIBUTION IN MODERN ENERGY EFFICIENT ELECTRICAL VEHICLES	
Zoran STEVIC, Borivoje BEGENISIC, Dušan MURGASKI, Luka STAJIC, Sanja PETRONIC, Ilija RADOVANOVIĆ, Suzana POLIC	227
12. PRIMERI PRIMENE VIŠEKRITERIJUMSKOG ODLUČIVANJA U OBLASTI OBNOVLJIVIH IZVORA ENERGIJE	
EXAMPLES OF THE APPLICATION OF MULTI-CRITERIA DECISION-MAKING IN THE FIELD OF RENEWABLE ENERGY SOURCES	
Zoran STIRBANOVIC, Dragiša STANUJKIĆ, Jovica SOKOLOVIC.....	233

Životna sredina, održivost i politika:

1. RAZMATRANJE PRISUSTVA FENANTRENA U OPŠTINI BOR NA BAZI NJEGOVOG SADRŽAJA U LIŠĆU I STABLJKAMA HEDERA HELIX L.	
A CONSIDERATION OF PHENANTHRENE PRESENCE IN BOR'S MUNICIPALITY BASED ON ITS CONTENT IN LEAVES AND STEMS OF HEDERA HELIX L.	
Aleksandra D. PAPLUDIS, Slađana C. ALAGIC, Snezana M. MILIC, Jelena S. NIKOLIC, Dragana V. MEDIĆ, Zoran M. STEVIC, Vesna P. STANKOV JOVANOVIĆ.....	239
2. PERSPEKTIVE GRADSKOG VAZDUŠNOG SAOBRAĆAJA U BEOGRADU, SRBIJA	
PROSPECTS OF URBAN AIR MOBILITY IN BELGRADE, SERBIA	
Jelena SVORCAN, Djordje CANTRAK, Jelena ANDRIC, Andrea IANIRO.....	245

3. ULOGA SINERGIJE RUDARSKIH I RAČUNARSKIH TEHNOLOGIJA U PROCESU TRANZICIJE KA OBNOVLJIVIM IZVORIMA ELEKTRIČNE ENERGIJE	
THE ROLE OF THE SYNERGY OF MINING AND COMPUTER TECHNOLOGIES IN THE PROCESS OF TRANSITION TO RENEWABLE ELECTRICAL POWER SOURCES	
Predrag STOLIC, Ilija RADOVANOVIĆ, Zoran STEVIĆ, Dejan PETROVIĆ.....	253
4. ODRŽIVOST REŠENJA ZASNOVANIH NA OBNOVLJIVIM IZVORIMA ELEKTRIČNE ENERGIJE – INFORMATIČKI PRISTUP	
SUSTAINABILITY OF SOLUTIONS BASED ON RENEWABLE SOURCES OF ELECTRICITY - ICT APPROACH	
Predrag STOLIC, Ilija RADOVANOVIĆ, Zoran STEVIĆ	261
5. CHATGPT, MATERIJALI I OBNOVLJIVI IZVORI ENERGIJE: JEDAN NEELABORIRANI PROSTOR	
CHATGPT, MATERIALS AND RENEWABLE ENERGY SOURCES: ONE UNREALIZED SPACE	
Suzana POLIĆ, Sanja PETRONIĆ, Marko JARIĆ.....	269
6. ANALIZA STRUKTURE OŠTEĆENJA GRAĐEVINSKIH KONSTRUKCIJA NA OSNOVU ODREĐIVANJA FRAKCIONOG SASTAVA OSTATAKA	
ANALYSIS OF THE STRUCTURE OF BUILDING STRUCTURE FAILURES BASED ON THE DETERMINATION OF THE FRACTIONAL COMPOSITION OF DEBRIS	
Valeriia CHORNA, Elena PONOMARYOVA, Sergey SHATOV, Liliia DRUZHININA.....	279
7. UTICAJ EFEKTA STAKLENE BAŠTE NA KLIMATSKE PROMENE	
THE INFLUENCE OF THE GLASS GARDEN EFFECT ON CLIMATE CHANGES	
Sladjana JEZDIMIROVIĆ, Marina DOJCINOVIĆ	287
8. PRIMENA TEHNOLOGIJE 3D ŠTAMPE BETONA U REPUBLICI SRBIJI	
APPLICATION OF 3D CONCRETE PRINTING TECHNOLOGY IN SERBIA	
Stefan Z. MITROVIĆ, Ivan IGNJATOVIĆ.....	295
9. ULOGA VODOPROPUSNIH PROIZVODA U POPLOČAVANJU URBANIH SREDINA U SVETLU ODRŽIVOG KORIŠĆENJA RESURSA	
THE ROLE OF PERMEABLE PRODUCTS IN THE PAVING OF URBAN ENVIRONMENT IN THE LIGHT OF SUSTAINABLE USE OF RESOURCES	
Marina ASKRABIĆ, Aleksandar RADEVIĆ, Aleksandar SAVIĆ	301
10. OTPADNO STAKLO KATODNIH CEVI U PRIPREMI BETONA – POVEĆAVANJE ODRŽIVOSTI	
CATHODE RAY TUBE WASTE GLASS IN CONCRETE PREPARATION – INCREASING SUSTAINABILITY	
Ivana JELIĆ, Aleksandar SAVIĆ, Tatjana MILJOJČIĆ, Marija SLJIVIĆ-IVANOVIĆ, Marija JANKOVIĆ, Slavko DIMOVIĆ, Dimitrije ZAKIĆ, Dragi ANTONIJEVIĆ	309
11. DOPRINOS STUDIJI VEGETACIJSKOG POKRIVAČA: STUDIJA SLUČAJA ZELENIH POVRŠINA U GRADU HRAOUA (ALŽIR)	
CONTRIBUTION TO THE STUDY OF VEGETATION COVER: A CASE STUDY OF GREEN SPACES IN THE CITY OF HRAOUA (ALGERIA)	
Mostafia BOUGHALEM	317

12. TRANZICIJA KA OBNOVLJIVIM IZVORIMA ENERGIJE, DEKARBONIZACIJA I PROMENE U ENERGETSKOM SEKTORU KOJE UTIČU NA RADNIKE U TRADICIONALNIM INDUSTRIJAMA TRANSITION TO RENEWABLE ENERGY SOURCES, DECARBONIZATION, AND CHANGES IN THE ENERGY SECTOR AFFECTING WORKERS IN TRADITIONAL INDUSTRIES Miloš CURCIC	323
--	------------

Aplikacije:

1. IMPLEMENTACIJA SOLARNE ELEKTRANE SNAGE 200 KWP NA RAVNOM KROVU U PARAĆINU IMPLEMENTATION OF 200 KWP SOLAR POWER PLANT ON A FLAT ROOF IN PARAĆIN Bosko IVANKOVIC, Zoran LAZAREVIC, Ilija RADOVANOVIC, Misa STEVIC, Predrag STOLIC, Dejan ILIĆ, Zoran STEVIC	329
2. FIZIČKO-HEMIJSKA KARAKTERIZACIJA ŠTAMPANIH PLOČA PHYSICO-CHEMICAL CHARACTERIZATION OF PCBs Silvana B. DIMITRIJEVIC, Aleksandra T. IVANOVIC, Srdjana MAGDALINOVIC, Stefan S. DJORDIJEVSKI, Stevan P. DIMITRIJEVIC	333
3. DEALLOYING PDNI5 LEGURE U 0.5M SULFATNOJ KISELINI DEALLOYING OF PDNI5 ALLOY IN 0.5M SULFURIC ACID Stevan P. DIMITRIJEVIC, Silvana B. DIMITRIJEVIC, Aleksandra T. IVANOVIC, Renata KOVACEVIC	341
4. SAGOREVANJE OTPADNOG TERMOBARIČNOG EKSPLOZIVA POD KONTROLISANIM USLOVIMA KAO IZVOR ENERGIJE COMBUSTION OF WASTE THERMOBARIC EXPLOSIVE UNDER CONTROLLED CONDITIONS AS A SOURCE OF ENERGY Danica BAJIC, Mirjana KRSTOVIC, Mladen TIMOTIJEVIC, Bojana FIDANOVSKI	351
5. INTERAKCIJE LASERA OD INTERESA ZA MATERIJALE U SISTEMIMA I KOMPONENTAMA U TRANSFORMACIJI ENERGIJE U LINEARNOM I NELINEARNOM OPSEGU LASER INTERACTION OF INTEREST FOR MATERIALS IN SYSTEMS AND COMPONENTS IN ENERGY TRANSFORMATION IN LINEAR AND NONLINEAR RANGES Milesa SRECKOVIC, Aleksandar BUGARINOVIC, Milanka PECANAC, Zoran KARASTOJKOVIC, Milovan JANIĆIJEVIC, Aleksander KOVACEVIC, Stanko OSTOJIC, Nenad IVANOVIC	359
6. DETEKCIJA MELASE LAŽNIH DATULA INFRACRVENOM SPEKTROSKOPIJOM PRIMENOM HIJERARHIJSKE KLASIFIKACIJE DETECTION OF DATE MOLASSES ADULTERATED BY INFRARED SPECTROSCOPY USING ASCENDING HIERARCHICAL CLASSIFICATION Samir CHERIGUI, Ilyes CHIKHI, Hadj FAYÇAL DERGAL, Ferial CHELLALI, Hanane CHAKER	369
7. DETEKCIJA FALSIFIKOVANJA MELASE GROŽĐA FIZIKO-HEMIJSKIM PARAMETRIMA DETECTION OF ADULTERATION OF GRAPE MOLASSES BY PHYSICO-CHEMICAL PARAMETERS Samir CHERIGUI, Ilyes CHIKHI, Hadj FAYÇAL DERGAL, Ferial CHELLALI, Hanane CHAKER	373

8. SENZOR SALINITETA ZASNOVAN NA HEKSAGONALNOM FOTONOM KRISTALNOM VLAKNU SALINITY SENSOR BASED ON A HEXAGONAL PHOTONIC CRYSTAL FIBER Ilhem MIREL, Hicham CHIKH-BLED.....	377
9. NAPREDAK U FOTONSKIM KRISTALNIM VLAKNAMA: METODE PROIZVODNJE I PRIMENA ŠIROKOG SPEKTRA ADVANCEMENTS IN PHOTONIC CRYSTAL FIBER: FABRICATION METHODS AND BROAD-SPECTRUM APPLICATIONS Mohammed DEBBAL, Hicham CHIKH-BLED, Mouweffeq BOUREGAA, Mohammed CHAMSE EDDINE OUADAH	385
10. ENERGETSKA EFIKASNOST PREDIZOLOVANIH PLASTICNIH CEVI ENERGY EFFICIENCIES OF PRE-INSULATING PLASTIC PIPES Vasilis ZOUIDIS.....	393
11. STATISTIČKO MODELOVANJE NEKIH EKOLOŠKI PRIHVATLJIVIH LEGURA NA BAZI BAKRA STATISTICAL MODELING OF SOME ENVIRONMENTALLY-FRIENDLY COPPER-BASED ALLOYS Aleksandra T. IVANOVIC, Silvana B. DIMITRIJEVIC, Stevan P. DIMITRIJEVIC, Branka B. PETKOVIC.....	403
12. SPEKTROSKOPSKA ANALIZA NATRIJUM KARBONATA SPECTROSCOPY ANALYSIS OF ACTIVATED SODIUM CARBONATE Natasa DJORDJEVIC, Milica VLAHOVIC, Slavica MIHAJLOVIC, Nenad VUSOVIC, Srdjan MATIJASEVIC	409
13. ANALIZA PERFORMANSI KRUŽNOG FOTONSKOG KRISTALNOG VLAKNA ZA TERAHERC APLIKACIJE PERFORMANCE ANALYSIS OF CIRCULAR PHOTONIC CRYSTAL FIBER FOR TERAHERTZ APPLICATIONS Mohammed CHAMSE EDDINE OUADAH, Mohammed DEBBAL, Assia AHLEM HARRAT, Hicham CHIKH-BLED, Mouweffeq BOUREGAA	415
14. POSTUPAK IZRADE POLIMERNOG KALUPA ZA ISPITIVANJE NA ISTEZANJE BIOKOMPOZITNIH MATERIJALA POLYMER MOULD MANUFACTURING FOR TENSILE TESTING OF BIOCOMPOSITE MATERIALS Marija BALTIC, Milica IVANOVIC, Igor STAMENKOVIC, Miloš VORKAPIC, Aleksandar SIMONOVIC	421
15. HABANJE Ti-6Al-4V NANOKOMPOZITA SA DISPERGOVANIM ZrO₂ DOBIJENOG MEHANIČKIM LEGIRANJEM I SPARK PLAZMA SINTEROVANJEM WEAR BEHAVIOR OF ZrO ₂ DISPERSED Ti-6Al-4V ALLOY NANOCOMPOSITES PREPARED BY MECHANICAL ALLOYING AND SPARK PLASMA SINTERING R. KARUNANITHI, M. PRASHANTH, M. KAMARAJ, S. SIVASANKARAN	427
16. PROIZVODNJA NISKOLEGIRANOG Cr-Mo-Ni ČELIKA U ELEKTROLUČNOJ PEĆI PRODUCTION OF LOW ALLOY Cr-Mo-Ni STEEL IN ELECTRIC ARC FURNACE M. GOJIC, M. DUNDJER, S. KOZUH, I. IVANIC, D. DUMENCIC	435
17. NUMERIČKA SIMULACIJA I DIZAJN SPOJNICA OD FOTONSKIH KRISTALNIH VLAKNA ZA SEPARACIJU TALASNIH DUŽINA NUMERICAL SIMULATION AND DESIGN OF A PHOTONIC CRYSTAL FIBER COUPLER	

FOR WAVELENGTH SEPARATION Assia AHLEM HARRAT, Mohammed CHAMSE EDDINE OUADAH, Mohammed DEBBAL.....	445
18. FOTOKATALITIČKA DEGRADACIJA KONGO CRVENE BOJE KORIŠĆENJEM KOMPOZITA UIO-66 METALO-ORGANSKIH MREŽNIH STRUKTURA I METALNIH OKSIDA PHOTOCATALYTIC DEGRADATION OF CONGO RED DYE USING UIO-66 MOF-METAL OXIDES COMPOSITES Dimitrije PETROVIC, Marija EGERIC, Radojka VUJASIN, Yi-nan WU, Fengting LI, Ljiljana MATOVIC, Aleksandar DEVECERSKI	451
19. EKSPERIMENTALNA OPTIČKA ANALIZA OTPORNOSTI NA LOM NERĐAJUĆEG ČELIKA EXPERIMENTAL OPTICAL ANALYSIS OF STAINLESS STEEL FRACTURE BEHAVIOUR Katarina COLIC	461
20. OPTIMIZOVANI PRORAČUN ČELIČNIH HALA NA DEJSTVO POŽARA OPTIMIZED FIRE DESIGN FOR STEEL PORTA-FRAMED SHEDS Filip LJUBINKOVIĆ, Luís LAÍM, Aldina SANTIAGO	469
21. HIDROFOBIZACIJA KALCITA STEARINSKOM KISELINOM MOKRIM POSTUPKOM HYDROPHOBIZATION OF CALCITE BY WET METHOD USING STEARIC ACID Slavica MIHAJLOVIC, Nataša DJORDJEVIC, Vladan KASIC, Srdjan MATIJASEVIC.....	479
22. INDEX ZA PROCENU STRUKTURALNE EFIKASNOSTI ČELIČNIH RAMOVA INDEX FOR THE ASSESSMENT OF STRUCTURAL EFFICIENCY OF STEEL PORTAL FRAMES Filip LJUBINKOVIC, Luís Simões da SILVA	485
23. RAZVOJ APARATURE ZA IN SITU ISPITIVANJE ANKERA NOSACA SOLARNIH PANELE DEVELOPMENT OF THE APPARATUS FOR IN SITU TESTING OF SOLAR PANEL RACKING ANCHORS Gordana BROČETA, Aleksandar SAVIC, Milica VLAHOVIC, Sanja MARTINOVIC, Tatjana VOLKOV HUSOVIC.....	495
24. POVEĆANJE EFIKASNOSTI DOBIJANJA BIOGASA I NJEGOVOG KORIŠĆENJA U POSTROJENJU ZA TRETMAN KOMUNALNIH OTPADNIH VODA INCREASING THE EFFICIENCY OF BIOGAS PRODUCING AND ITS UTILIZATION IN THE MUNICIPAL WASTEWATER TREATMENT PLANT Darja ZARKOVIC, Milica VLAHOVIC, Bilyana ISZITY.....	503
25. ISPITIVANJE MORFOLOGIJE SUMPOR-POLIMERNOG KOMPOZITA MORPHOLOGY INVESTIGATION OF SULFUR-POLYMER COMPOSITE Milica VLAHOVIC, Kong FAH TEE, Aleksandar SAVIC, Nataša DJORDJEVIC, Slavica MIHAJLOVIC, Tatjana VOLKOV HUSOVIC, Nenad VUSOVIC	513
26. PRIMENA VARENJA, TVRDOG I MEKOG LEMLJENJA U IZRADI SOLARNIH SISTEMA APPLICATION OF WELDING, BRAZING AND SOLDERING IN SOLAR SYSTEMS MANUFACTURING Zoran KARASTOJKOVIC, Milesa SRECKOVIC, Misa STEVIC.....	521
27. ŠTETNI EFEKTI LEGURA ZA LEMLJENJE IZ ŠTAMPANIH KOLA PRILIKOM ZAJEDNIČKOG TOPLJENJA SA GVOZDENIM I ČELIČNIM DELOVIMA HARMFULL EFFECTS OF SOLDERING ALLOYS FROM PRINTED CIRCUITS WHEN MELTED TOGETHER WITH IRON&STEEL COMPONENTS Zoran KARASTOJKOVIC, Ognjen RISTIC, Misa STEVIC	529

CHATGPT, MATERIJALI I OBNOVLJIVI IZVORI ENERGIJE : JEDAN NEELABORIRANI PROSTOR

CHATGPT MATERIALS AND RENEWABLE ENERGY SOURCES: ONE UNREALIZED SPACE

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Apstrakt

Upotreba ChatGPT mogućnosti u prikupljanju relevantnih naučnih informacija u ovoj fazi tehnološkog razvoja pokazuje višeslojnost problema valorizovanja naučnih izvora. U ovom radu prikazani su rezultati preliminarnih istraživanja o razvoju znanja o obnovljivim izvorima energije kroz vreme, u još uvek neelaboriranom prostoru heritološke predmetnosti. Studija slučaja odnosi se na delo "Le Vide, L'énergie et la Matière: Un essai de physique théorique " autora Žerara Beržea.

Ključne reči: obnovljivi izvori energije; naučni izvori; heritologija

Abstract

The use of ChatGPT possibilities in collecting relevant scientific information, at this phase of technological development shows the multi-layered of the problem of valorization of scientific sources. In this paper, the results of preliminary research on the development of knowledge on the sources of renewable energy have been presented through time, in the still unrealized space of heritological matter. Our case study refers to a scientific work „Le vide, l'énergie et la matière: Un essai de physique théorique“ by Gérard Berger.

Key words: renewable energy sources; scientific sources; heritology

1 Introduction

ChatGPT (Generative pre - Trained Transformer), a new phenomenon of artificial intelligence, which in public, virtual, is just a few months, representing another modern technological paradox, which unites two opposites: revolution and evolution. The revolution is reflected in the change that this system has made in the Global Technology Community for a very short time, as the fastest growing application for consumer software in history [1,2], which Aaron Levie describes: “ChatGPT is one of those rare moments in technology where you see a glimmer of how everything is going to be different going forward.”, [3]. Evolution takes place in the same space and time, in which ChatGPT is experiencing iterations from the 2018 GPT-1, to the latest GPT-4 from March 2023, which is otherwise available through the application programming (API), [4], in anticipation of the announced

version of the GPT - 4.8. Evolucija is aimed at further integration into more complex software systems, which is why ChatGPT is actually an early model of what will making artificial intelligence in their future generative models and tools.

The technological-commercial race that has begun in the production of advanced models in such a short time of this phenomenon, has already caused the conclusion that it is definitely about the ChatGPT "resistance futile". We find this conclusion in the text whose authorship is shared by man and ChatGPT, as the signed author of the text [5]. However, many researchers and editors of scientific journals, indicate that the ChatGPT contribution cannot be considered authorship, [6,7]. In addition, despite the fascinating opportunities that ChatGPT shows, but numerous research and experience showed the different imperfections of this system, and there are also the opinions that he certainly brings the destruction changes in science [8], so the issue of learning neural networks is set as basic. It is obvious that the methodology of learning this system is set in another plan, which should help to remove any observed anomalies, and the ChatGPT system improves the planning and methodical. It is equally significant and the issue of achieving possible civilization consensus in the methodological orientation in further activation of artificial intelligence: Can we adapt artificial intelligence to man, or will one be forced to adapt to artificial intelligence? In both cases, for a civilization for now the ultimate outcome is uncertain, [9].

When it comes to heritological views of this issue, the most adequate approach is that the development of artificial intelligence should follow the way of human thinking through time [10], which represents the intellectual inheritance of our civilization, ie the intangible value recognized and protected by heritology. Study of opinions on the problems in the different periods of human development, helps to see the anomalies, misconception, the theoretical overcoming of complex natural phenomena, as well as different ways to overcome in the same cognitive space.

Therefore, in this paper, we consider one such, unelaborated cognition space, in which there are many potential „traps“ for ChatGPT, because the system could be found in "hallucinations" [11], as events are described when ChatGPT generates fictional scientific references and gives meaningless answers. In this sense, in our focus is one cognitive space that is significant for renewable energy sources, and related to the necessary distinctions between matter and materials, which should recognize ChatGPT. The specificity of this research refers to the need for ChatGPT to recognize the opinion that evolves in the range of the XVII-XXI century. To illustrate this task, we have chosen the case study that relates to *Le Vide, L'énergie et la Matière: Un essai de physique théorique* by Gérard Berger [12], as the last in a series actualization of of *Fatio - Le Sage Theory*.

2 „De la Cause de la Pesanteur“

As is well known, the history of *Fatio-Le Sage Theory* begins from Switzerland mathematician Nicolas Fatio de Duillier (1664-1753), and friend of Sir Isaac Newton and Christiaan Huygens [13], famous for an explanation that he gave for Zodiacal phenomenon in 1684: light as Sunlight scattered by an interplanetary cloud of fine particles [14], it is brightest when observing at a small angle with the Sun. For our research is important, the Fatio in 1690 was formulate its own view of the physical cause of gravity (kinetic theory of gravity) [15], which will later be known as "Le Sage's Theory of Gravitation" [16]. In addition, Fatio was also involved in the problem of optimization of capturation of solar energy and its using for increasing agricultural yields, which he published under the imprimatur of the London Royal Society [17]. Due to the complex issues to which his work was dedicated, which also includes the theme of natural phenomena of significant and for research of renewable energy sources, it is indisputable that the natural philosophy of Nicolas Fatio is also significant for the history of opinion on renewable energy sources.

Interestingly, Fatio has not published his theory about the cause of gravity (Fatio's Papers Had Been Read at Meetings of the Royal Society in the Early 1690's But not formally Published), so she was named de la *Cause de la Pesanteur*, published first in 1929. Published it Karl Bopp, German Historian of Mathematics, based on the only survive manuscript of Fatio found in the legacy of Jacob Bernoulli. Today, in the research of history of this theory, the definition of generally accepted:

Le Sage's theory of gravitation is a kinetic theory of gravity originally proposed by Nicolas Fatio de Duillier in 1690 and later by Georges-Louis Le Sage in 1748, [18].

The life of this theory through time (Fig.1) has its own scientific and out-of-the-science complication, which related to the question of authorship (Fatio or Le Sage) [19] and the essence of the theory [20], the refusal of its reach [21], the relativization of this denial [22] and the delimitous confirmation of her individual ideas, with the recent detection of gravitational waves and “[...] as an alternative to the General Relativity for describing the mechanism of gravitational attraction in Euclidean Space and Newtonian Time [...]” [23]. In this range of 333 years, the research has its natural and philosophical aspects, in the extent to which the Atomic Physics itself has its own physical and metaphysical dimension, from the beginning of thinking about atomists. Authentic documents from heritage of Nicolas Fatio are still the subject of research in the collections of old and rare documents and books, such as : William Andrew Clark Memorial Library in Los Angeles; British Library; Bibliothèque de Geneve; Bijzondere Collecties of the University of Amsterdam and other, university libraries where there are valuable copies or still unpublished original documents.

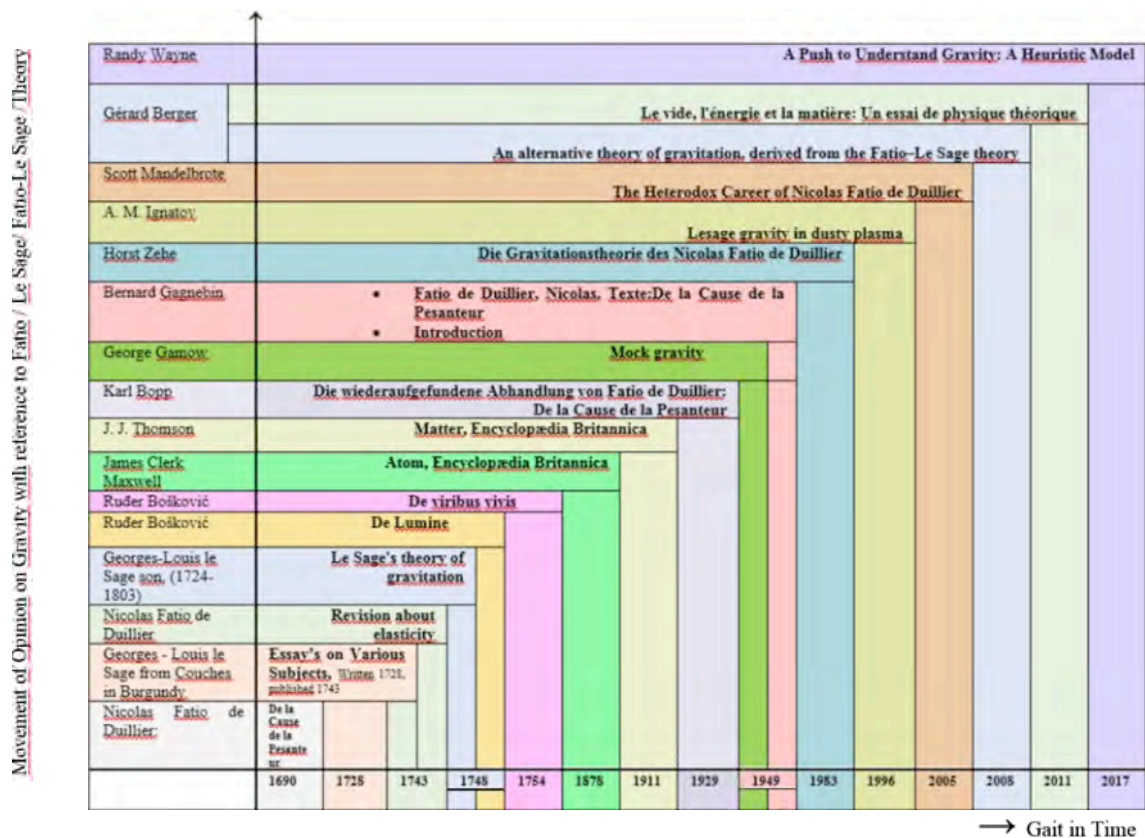


Fig.1. Fatio-Le Sage Theory as part of the opinion on gravity over time (1690-2017)

Bearing in mind that about *Fatio - Le Sage Theory* written and discussed by the most prestigious physicists and historians of the science that dealt with gravity, from that wide volume of research from the 17th century to 21th century, we extracted the opinion by James Clerk Maxwell from 1878 year : „ [...] the only theory of the cause of gravitation which has been so far developed as to be capable of being attacked and defended [...]” [24]. Looking at the point of view of heritology, it can also be said: theory that equally in the 21th century, as it did in the 17th century, intriguing for the human thought. From that point of view and we make thematization themselves of the "traps" that can be problem for the ChatGPT in the process of mastering the data, how about Le Sage's theory of gravitation, so and about the *Le Vide, L'énergie et la Matière: Un essai de physique théorique*, by pointing out that these „traps“ are in the narrowest connection with the civilization values that in such a technological system should be installed.

3 „Le Vide, L'énergie et la Matière: Un essai de physique théorique“

The research of the French author of Gérard Berger, which was published in July 2008 in work called an alternative theory of gravitation, derived from the *Fatio-Le Sage Theory*, [25], ends with an indicative statement: „The theory presented here does not need non Euclidean geometry and the calculations are simpler than those of the General Relativity“. This scientist then published an essay in 2011 called *Le Vide, L'énergie et la Matière: Un essai de physique théorique*, which is perfecting until 2018, [12]. According to Monique Angerand - Berger, „[...] This long work, made of fruitful or unsuccessful attempts that had to be repeated in order to start again, eventually took shape, and led to this original theory explaining the origin of the forces in a simple and logical way and where he refuted point by point all the criticisms that had led to the abandonment of the theory of the ether during the 20th century [...]“, [28].

From the point of view of heritology, independent of the interpretation that will given by modern science, we see this work as one of the tools of protection of intellectual heritage, which allows the of *Fatio-Le Sage Theory* moving to continue in the time, initially created from 17th century to contemporary moment. At the same time, it is also observed that the expression of the absence of the need for non - Euclidian Space also preserves the intellectual legacy of the concept of Euclidean geometry.

Gérard Berger states that his alternative theory „[...] offers mathematical explanations of the origin of forces, luminous phenomena and the evolution of the Universe starting from simple hypotheses. Developed from the concept of the ether of Fatio and the Sage, this model makes it possible to determine the characteristics of the material molecules from those constituting the "emptiness" and reconsiders the evolution of the universe. " On the return to simple hypotheses of ancient concept of ether, speaks and analysis of distinctions between the scientific views of Fatio and Le Sage, in which J. Berger states about Lesage's theory of corpuscles ultramondains and ether : „[...] Lesage understood the corpuscles ultramundane as subtle celestial matter and carriers of the primordial movements in the universe which were characterised by their proximity to the divine.“ [16]

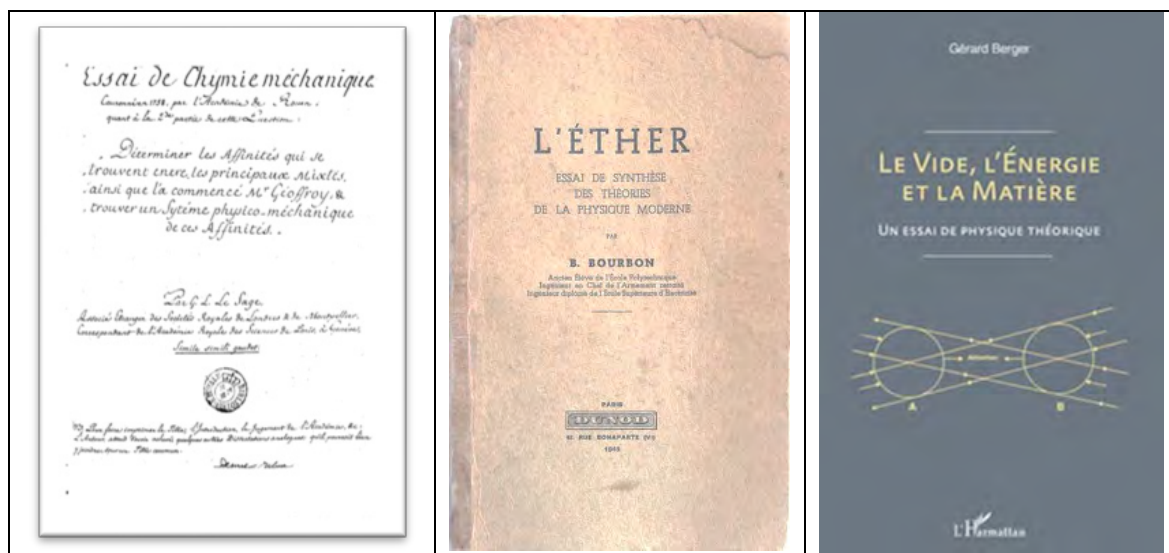


Fig. 2. a- Lesage, Georges Louis (1724-1803): *Essai de chimie mécanique, Couronné En 1758 Par l'Académie de Rouen* [26]; b - B. Bourbon, *L' ether: essai de synthèse des theories de la physique moderne, 1948.* [27] and seventy years later: c - Gérard Berger : *Le Vide, L'énergie et la Matière: Un essai de physique théorique, 2018.* [12]

These directions of thinking belong to the learning space in which we find newer works related to the Push-Gravitation phenomenon, where in accordance with Modern Knowledge of the Cosmic Background Radiation, states: „...Push-gravity is an alternative theory to General Relativity, which originates back to the time of Newton when scientists Fatio and later Le Sage proposed that gravity was due to an imbalance of continuous and uniform particle streams we cannot see. Today, we know

that there exists such a uniform field-the cosmic background radiation. ...“ [28]. By keeping this in mind, we can say that the XXI century, in relation to the exclusivity of the contribution of *Fatio–Le Sage Theory* in the last centuries, in the contemporary moment building by the point of view: to contribution by this theory must be interpreted in accordance with current understanding of elementary particles, which makes the difference between this and previous cognitive systems. In other words, the work *Le Vide, L'énergie et la Matière: Un essai de physique théorique*, warns that in this century, the awareness of the intellectual contributions of previous epochs can only be actualized to in accordance with the current degree of understanding of natural phenomena.

4 "Traps" to ChatGPT

Unlike the natural understanding, which achieves by human intelligence, in the field of artificial intelligence is to connecting these phenomena use and learning of neural networks. Bearing in mind that during the multi-centuries duration in different cognitive spaces, in the review of Theory, a distinctive multi-layered of opinions about gravity was created. In this regard, ChatGPT should overcome a complex task. Here we single out the most representative problems: Factographic and those interpretive, which include philosophical, geometric and metaphysical standpoints.

4.1 Factography

In the field of facts, for example, identity and scientific differences should be identified between two personality of the same name (father and son), Georges - Louis Le Sage, (Fig.1). Among them are differences that relate to manner of thinking, the precision of knowledge, originality and the extent of scientific / religious views, intellectual characters. Father Le Sage is a distinguished teacher of mathematics and physics as well as a moral philosopher and theologian [29], but son Le Sage is a natural philosopher of mechanical philosophy (concept of particules ultramondaines), known for its *Essai de chimie mécanique* (Rouen, 1758), [26].

The elderly Le Sage 1743 publishes Essay's On Various Subjects [30], comparing scientific and religious thinking and among other things, he formulate the formulation we consider as complex for this phase of development ChatGPT [31]:

- [...] Truth is not always probable. In physics, the principle of impulse is most probable [...]
- [...] In geometry, all that is possible is true. A geometrician admits indifferently several possible systems of astronomy. But in any other context, if a thing is possible, it by no means follows that it is fact [...]
- [...] What is true in some connection is not always true...[...]

This example shows that the attitude towards truth and geometry, some of the complex issues for artificial intelligence, as they and for human opinion are insufficiently and completely understating because intellectual difficulties due to the layering and metaphysical origin, as for example Leibniz's *Principium Identitatis Indiscernibilium* [32] (a principle of analytic ontology). Bearing in mind that there are areas that are not observable experimentally, or positive induction, but only by using deduction [33], but on the basis of the epistolar correspondence led by Nicolas Fatio, the natural philosophy method describes as a combination of scientific passion and religious commitment [34].

A special challenge would represent rational-logical and rational-metaphysical (characteristic of the middle age) of distinctions, i.e. differences between logical reasons and real cause. In this sense, would be especially important the question of differentiation of views to space and time and context in which the involvement of the tautology occurs. It is an indicative letter that writes younger Le Sage for the Duke of La Rochefoucauld d' Enville, dated in 1778, hi writes about French authors of elementary mathematics: „ [...] In their elementary treatises of mathematics and physics, the French writers [...] treat geometry the least geometrically possible, under the pretence that algebraic demonstrations are the shortest: as if the only object were to get to the end, and as if the road leading to it were of no importance [...]“, [35]. To remind, this view of the relationship between modern authors towards geometry happens at the time when there is already *Theoria Philosophiae naturalis* by Roger Joseph Boscovich (1711-1787), which writes: " „ [...] De Geometria ago, quae vim suam in mea

Theoria retinet omnium [...]“ [36], that is to be with Boscovich opinion, that geometry is imaginary (as possibilities) and that it is still valid in nature, which practically discusses that the continuity in space is converted to a methodical tool in explaining nature reality, [37]. How to list Kasier [38], the Boscovich's "[...] Marking of space and time resembles the Basic Leibniz's view, but when it is more detailed, it immediately see that it is used here in a completely different sense and with quite the opposite tendency [...]", which is another example for the possibility of a „trap“ for ChatGPT.

4.2 Abstractedly Processing and Style of expression and Interpretation

When it comes to recognizing the style of expression, which is considered as more successful products that can provide ChatGPT, in this case, it would mean the ability to comparatively understand modern and old manuscripts and rare books, which should be synthesized in the desired thematic framework. On the other hand, it is also the logic and model of abstraction, so the recognition that should perform by artificial intelligence includes the problem of relation a priori- a posteriori (cognition inconsistently of experience - cognition based on experience), then the relationship between dynamism - atomism, as well as the attitude of allusions - metaphor. But, it should not be forget that a great commitment to Alchemia in the 17th century and that in that field, Fatio cooperated with Newton, who used the old and different language, today recognised as Newton's alchemic language, and which modern researchers describe as „[...] a deeply elusive language foreign to modern readers, one that coded chemical processes in allusion and metaphor [...]“. [39]

It is considered that Fatio had "crystal clear style", but research also show the documents, in which his expression is characterized as syncopated, [40] so it would be another „trap“ for ChatGPT. Particularly significant is the Fatio that it was fabulous with the highly high ability of the visualization and the drawing, which should be observed in the context of atomic iconography [41]. Relationships of the relation between matter - materials are also important questions that are not explicitly explicitly explained in the literature, and related to the way in which in the 17th century it was thought of the hierarchy of matter and how are the assessment of the quality of materials, and comparisons of material properties compared to their function [42 - 44].

5 Conclusion

In this paper, we presented thinking about gravity and related phenomena that is important for the history of the renewable energy sources, with the aim of pointing out obstacles to the artificial intelligence and its latest ChatGPT tools and providing adequate information in this area. From *Fatio - Le Sage Theory* from the 17th century, to *Le vide, l'énergie et la matière: Un essai de physique théorique* from the 21th century, the need to detect new angles of observing historical connections of scientific considerations is pointed out, as well as the ways of establishing new frameworks to understand the genesis of creating theory, its audits, denials or superstructures. Heritological view pointed out the need for the new correlations in the valorization of scientific sources to be built in accordance with the current understanding of natural processes, without final exclusivity. The analysis should contribute to the development of innovative approaches to the theoretical observation of the history of opinions that would be used to learn neural networks in accordance with the heritological view of the advancement of artificial intelligence tools.

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