

PROGRAM OF THE CONFERENCE

Wednesday, September 23

12:00–14:00 Registration

14:00–14:10 Opening

Chair: Yurii V. Dumin

14:10–14:50 **Pavel Kroupa**, The star-formation histories of nearby galaxies raises questions on cosmology

14:50–15:30 **Moritz Haslbauer**, Structure formation in LCDM and MOND

15:30–16:00 Coffee Break

Chair: Michal Krížek

16:00–16:30 **Wolfgang Oehm**, A possible constraint on the validity of general relativity for very strong gravitational fields

16:30–17:00 **Yurii V. Dumin**, The problem of causality in the uncertainty-mediated inflationary model

17:00–17:20 **Yurii V. Dumin**, The problem of flatness in various cosmological models

Thursday, September 24

Chair: Itzhak Goldman

9:00–9:45 **Václav Vavryčuk**, Cosmic microwave background as thermal radiation of intergalactic dust?

9:45–10:15 **Jan Papež**, Linear algebraic solvers in Cosmic Microwave Background data analysis

10:15–10:45 Coffee Break

Chair: Pavel Kroupa

10:45–11:05 **Joerg Dabringhausen**, Elliptical galaxies without dark matter

11:05–11:30 **Pavel N. Antonyuk**, Mathematics of the Hubble law

11:30–12:00 **Yash P. Aggarwal**, Vedic cosmology on the characteristics of dark matter: Implications for the search for dark matter particle

12:00–14:00 Lunch Break

Chair: Klaus Morawetz

14:00–14:50 **Itzhak Goldman**, Astrophysical bounds on mirror dark matter

14:50–15:20 **Ismael Ferrero**, A unified scenario for the origin of disk and elliptical galaxy structural scaling laws

15:20–15:30 **Conference photo**

15:30–16:00 Coffee Break

Chair: Wolfgang Oehm

16:00–16:50 **Michal Křížek**, Excessive extrapolations of Einstein's equations

16:50–17:10 **Daniele Sorini**, Radiation-Lambda equality and reionisation: coincidence or anthropic prediction?

17:10–17:40 **Charles Sven**, Physics of dark energy

Friday, September 25

Chair: Václav Vavryčuk

9:00–9:30 **Klaus Morawetz**, Exact solution of Einstein-Cartan equations with torsion

9:30–10:00 **Frederic Lassiaille**, Gravitational model of the three elements theory: Formalizing comments

10:00–10:30 **Ahmad Hujeirat**, The cosmological fate of neutron stars and their connection to dark matter and dark energy

10:30–11:00 Coffee Break

Chair: Moritz Haslbauer

11:00–11:20 **Thomas Prevenslik**, Cosmology and redshift in cosmic dust

11:20–11:50 **Václav Vavryčuk**, Considering light-matter interactions in Friedmann equations

11:50–12:10 **Kurt Koltko**, Gauge CPT and the baryonic Tully-Fisher law

12:10–14:00 Lunch Break

Chair: Yurii V. Dumin

14:00–14:30 **Michal Křížek**, A critical review of paradoxes in the special theory of relativity

14:30–15:00 **Yan Breck**, Imprint of quantum gravity model on observable cosmology

15:00–15:20 **Yash P. Aggarwal**, A working hypothesis of a cyclic universe that neither undergoes cosmic inflation or a Big Crunch based on Vedic cosmology

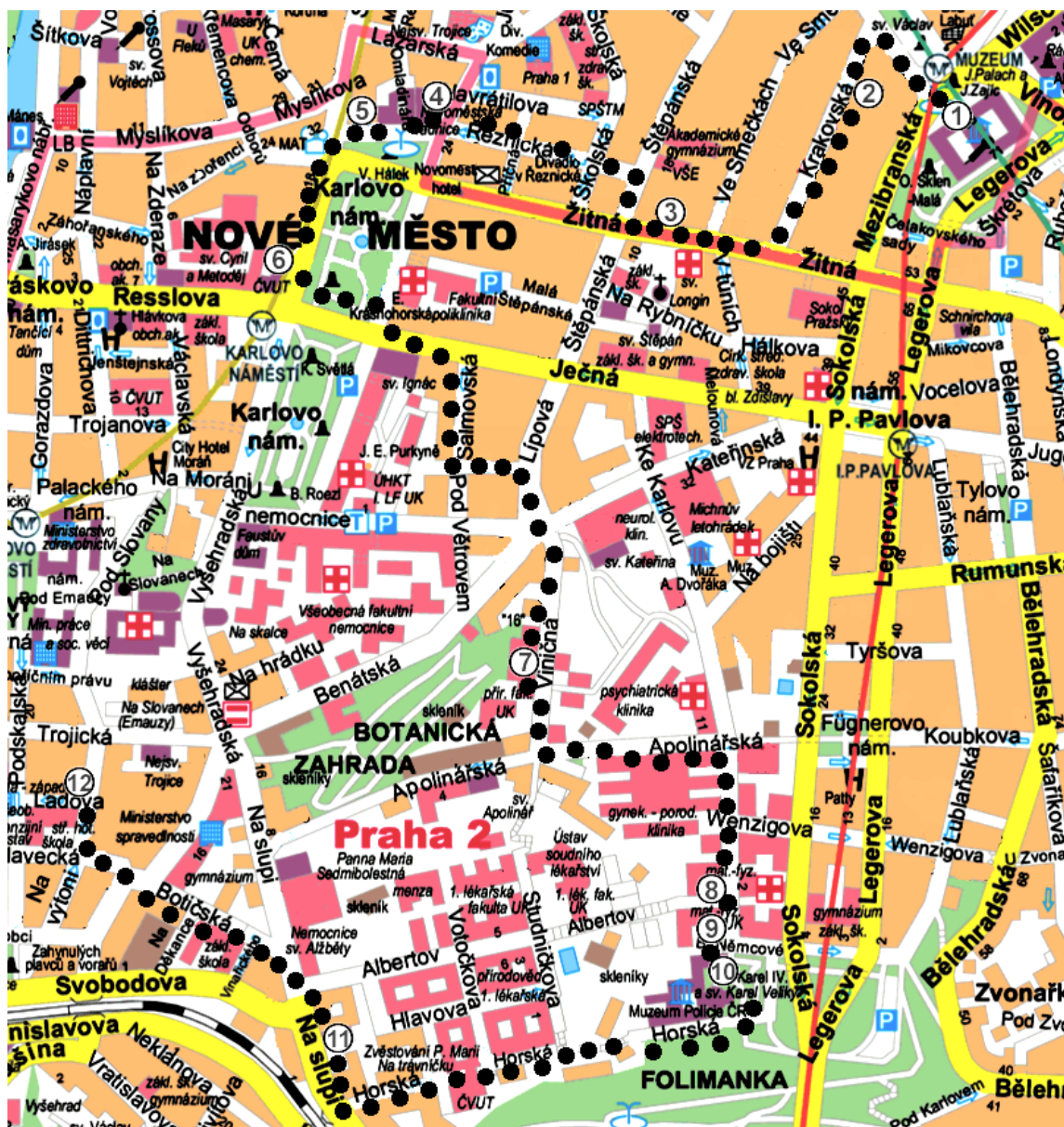
15:20–15:25 **Vladimír Novotný**, Cosmological coincidences in the expanding universe (Poster presentation)

15:25–15:30 **Albin Joseph**, Exact solutions of some dynamical variables in FRW universe with scalar field dynamics (Poster presentation)

15:30–16:00 Video presentations

Saturday, September 26

9:00–12:00 Excursion to the astronomical and cosmological sights of Prague guided by Michal Krížek. We will meet at 9:00 in front of the main gate of the Institute of Mathematics at Žitná 25.



Map of the proposed walk through the astronomical and cosmological sightseeings of Nové Město (New Town) according to [3].

Stop 1. Our walk will start at the main building of the National Museum which was completed in 1891. It originally housed the Czech Academy of Science and the Arts (ČAVU). In 1902, 72 plaques of red Meissen granite were placed on the outside walls of the building. We can find among them many famous mathematicians, physicists, and astronomers, for example, Křišťan from Prachatice (the author of a book on the astrolabe), Tycho Brahe (incorrectly spelled as Tycho de Brahe [2]), Tadeáš Hájek from Hájek, Martin Bacháček from Nauměřice, Johannes Kepler (see Figure 1) Jan Marek Marci, Prokop Diviš, Josef Stepling, Stanislav Vydra, František Josef Gerstner, Bernard Bolzano, and Christian Doppler.



Figure 1

Stop 2. In Krakovská Street No. 14/1362, Pavel Josef Šafařík has a memorial plaque. He is the father of the astronomer Vojtěch Šafařík who produced glass and metal mirrors. V. Šafařík had a private observatory in Vinohrady and was a professor of chemistry and descriptive astronomy at the University of Prague.

Stop 3. The Union of Czech Mathematicians and Physicists and the Institute of Mathematics of the Czech Academy of Sciences are located in Žitná No. 25/609. There is also the largest mathematical library in the Czech Republic which counts over 80 000 library units. Many of them are digitized, see www.dml.cz.

St. Longin's Rotunda stands nearby the Institute of Mathematics. It is one of the few preserved Romanesque rotundas in Prague. It originated from the 12th century as a parish church for the village Rybníček which was there before the founding of the Prague New Town in the middle of the 14th century. The astronomer Martin Bacháček from Nauměřice (professor at the University of Prague and a friend of Johannes Kepler) worked in a parish school of the nearby Church of St. Štěpán in Štěpánská Street.

Stop 4. On the eastern wall of the New Town City Hall, the standard of the Prague elbow (= 591.4 mm) is presented (see Figure 2). It was established in 1268 by the Czech king Přemysl Otakar II and remained unchanged¹ until 1765, i.e. for five centuries. For comparison, the definition of 1 meter changed during the last 60 years several times. Let us note further that the New Town Hall Tower contained an astronomical clock (horologe) like the Old Town City Hall Tower, see [3, p. 139].



Figure 2

¹In 1765, the Austrian archduchess Maria Theresa ordered the use of the Austrian units of measurement in Prague.

Stop 5. A memorial plaque on Charles Square No. 20 marks the place, where Christian Doppler (1803–1853), professor of mathematics at the Czech Technical University in Prague and the founder of the Institute of Physics in Vienna, lived before 1840 (see Figure 3). The date of his death on the plaque is incorrect and an unusual first name in the form of Kristian is presented. In 1842, he gave his famous lecture *On the colored light of binary stars* in the Patriotic Hall of Karolinum (formerly in Latin: Collegium Carolinum; at present the seat of Charles University). For the first time he introduced there relations that describe the Doppler phenomenon, see [1].



Figure 3

Stop 6. Foucault's pendulum 21 m long is situated in the entrance hall of the Czech Technical University on Charles Square No. 13/293. The French physicist Jean B. L. Foucault used a similar 67 m long pendulum in 1851 to demonstrate the Earth's rotation.

On the way to Stop 7, we can see a memorial plaque in honor of the Nobel Prize Winner Carl Ferdinand Cori (1896–1984) which is placed on his birthplace house in Salmovská Street No. 6/1693. He studied medicine in Prague in the next street U Nemocnice No. 5, where is another plaque and a memorial hall (see Figures 4 and 5). Then he left for the U.S.A. with his wife Gerty Cori. Here they received the Nobel Prize in Physiology or Medicine in 1947.



Figure 4



Figure 5



Figure 6

Stop 7. A memorial plaque (see Figure 6) in the lobby of the Faculty of Science of Charles University in Viničná Street No. 7/1594 recalls that Albert Einstein worked in this building in 1911–1912. He also had his office here, where he found the peace he needed to formulate basic ideas of the General Theory of Relativity. He received the Nobel Prize for Physics in 1921.

Stop 8. The Czech Institute of Physics of the Charles University of Prague is located in Ke Karlovu Street No. 5/2026. The construction of this building was realized mainly due to Professor of experimental physics Čeněk Strouhal (1850–1922). Teaching in this building was established from January 1908.

Stop 9. Dean's office of the Faculty of Mathematics and Physics of Charles University is situated in Ke Karlovu Street No. 3/2027.

Stop 10. James W. Herschel, the grandson of the famous William Herschel (the discoverer of the planet Uranus), is one of the founders of dactyloscopy. He is remembered in a dactyloscopic collection in the Museum of the Police of the Czech Republic in the former Augustinian Monastery Panny Marie a sv. Karla Velikého.

Stop 11. We shall proceed downstairs around the fortifications of Prague from the epoch of Charles IV. to the octagonal tower of a Gothic church Panny Marie Bolestné to Na Slupi Street No. 4a. The number 8 in the Middle Ages symbolized eternity. The known planets at that time together with the Sun and the Moon were supposed to move in seven spheres and according to the Aristotelian tradition, the eighth sphere of fixed stars was motionless.



Figure 7

Stop 12. The Czech Nobel Prize Winner in Chemistry Jaroslav Heyrovský lived in the period 1926–1951 in Ladova Street No. 8. At present there is a commemorative plaque (see Figure 7).

References

- [1] Doppler, Ch.: Ueber das farbige Licht der Doppelsterne und einiger anderer Gestirne des Himmels. *Abh. böhm. Ges. Wiss.* **2** (1842), 466–482.
- [2] Šolcová, A.: From Tycho Brahe to incorrect “Tycho de Brahe”. A searching for the first occurrence when the mistaken name of famous astronomer appeared. *Acta Univ. Carolin. Math. Phys.* **S46** (2005), 29–36.
- [3] Šolcová, A., Křížek, M.: Procházky Prahou matematickou, fyzikální a astronomickou (2. část). *Pokroky Mat. Fyz. Astronom.* **52** (2007), 127–141, available at www.dml.cz