

52nd International Symposium on Multiparticle Dynamics (ISMD 2023) – X17 confirmed

129 physicists from 32 countries across 5 continents attended the 52nd International Symposium on Multiparticle Dynamics held in Gyöngyös, Hungary, August 21-26, 2023, to discuss a broad range of topics including

- Collectivity in high energy collisions: jets and flows
- Cosmic ray and astroparticle physics
- Femtoscopy
- Forward physics: Diffraction, odderon and pomeron
- Hadronic final states in high p_T interactions
- Multiparticle correlations and fluctuations
- Proton structure, small-x and large-x physics
- Physics of X17 and other beyond standard model states
- Other important new developments in HEP
- Science outreach in Tokaj, Hungary.

The greatest attention at ISMD 2023 was paid to the X17 particle candidate, observed for the first time at the Institute for Nuclear Research (ATOMKI) in Debrecen, Hungary. Professor Krasznahorkay [presented](#) the latest nuclear reaction measurements of his group, performed with a new instrument. Professor Wong (Oak Ridge National Laboratory, USA) [presented his QED meson interpretation](#) of X17 and also of E38, [dating back to 2010](#). The results were confirmed at ISMD 2023 by [Hungarian](#), [Russian](#) and [Vietnamese](#) experimental groups. Professor Varró (Wigner RCP, Budapest, Hungary), [confirmed](#) the interpretation of professor Wong by providing an electromagnetic mass formula for X17. The observation of particle candidate [E38 was reported](#) by Dr. Abraamyán of JINR, Dubna, Russia.

A hot topic of ISMD 2023 was the nearly perfect fluid behavior, observed in high energy proton-proton and nuclear collisions. MDPI Universe sponsored the best young speaker and best poster prizes. Both awards went for speakers on this topic. Dr. Dash (University of Münster, Germany) has been selected as the best junior speaker for [her talk](#) discussing recent ALICE results at CERN LHC. Dr. Kincses (Eötvös University, Hungary) has been recognized for the best poster presenter for [his flash talk](#) on Lévy pion interferometry with STAR at BNL RHIC.

The solution of a 50 years old particle physics puzzle, the odderon exchange, predicted by [B. Nicolescu and L. Lukaszuk in 1973](#) also drew great attention. The first paper on a [statistically significant observation of odderon exchange](#) was published in February 2021 by a Hungarian-Swedish team, based on a re-analysis of public domain data and a newly found scaling law. This result has been [extended to 8 TeV](#) as reported by A. Ster. The second, statistically significant signal of odderon exchange was [published](#) by a Hungarian team in July 2021, using a model of Polish authors. These results were extended to low- t and to 8 TeV in the talks [of T. Csörgő](#) and [I. Szanyi](#). Another odderon observation, based on new TOTEM data, was [published by the D0 and TOTEM Collaborations](#) in August 2021. Between 2021 and 2023, publications in [Physical Review D](#), [Physics Letters B](#), and [EPJ C](#) questioned this proof of odderon exchange. These [criticisms were answered](#) at ISMD 2023 by K. Österberg (University of Helsinki), the physics coordinator of TOTEM.



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ISMD 2023 was closed with a science outreach section, where secondary school students from Croatia, Hungary, Mexico, Poland and The Netherlands participated online. The last talk was given by the secondary school student [Zsóri Georgina Anna](#) from Gyöngyös, Hungary. She presented a newly developed card game entitled „Find Your Own Odderon!”. **The students were able to find their odderon within about two minutes, playfully. The same task lasted for nearly 50 years for the physicists, who played according to the strict rules of science.**

All the ISMD 2023 presentations are archived at

<https://indico.cern.ch/e/ismd23> .

The organization of ISMD 2023 would have been nearly impossible without the support of **several civil, local and international sponsors**. We would like to express our gratitude [to all the ISMD 2023 sponsors](#) for their invaluable support and generosity.

Closed in Gyöngyös, Hungary as well as in Catania, Italy, on November 8, by

Prof. Tamás Csörgő, MAE, Chair of ISMD 2023,
Prof. Máté Csanád, MYAE, Scientific Secretary and
Dr. Tamás Novák, Ph.D, Co-chair of ISMD 2023.