4th Jagiellonian Symposium
on Advances in Particle Physics and Medicine
Collegium Maius & Collegium Novodvorscianum, 10-15 July 2022

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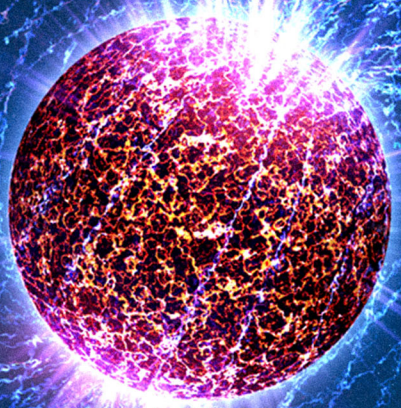
ALL IN A THIMBLE!
STRANGENESS IN THE NEUTRON STARS?



Prof. Catalina Curceanu
National Laboratory of Frascati, Italy

13 July 2022 at 19:30
Collegium Novum

Abstract:

What are neutron stars made of? It seems a trivial question, with an obvious answer: neutrons. But is this really so? We still don't know if these fascinating cosmic objects contain only neutrons or also exotic types of matter, including strange quarks. These stars are having twice the mass of the Sun in a radius of only about 10 km and extreme densities. To reach this density, the entire world population should be compressed in a .... thimble!

I will take you on a journey to discover the fascinating neutron stars and how we can study them with our accelerators, where experiments using particles with strange quarks are able to measure their strong interaction in exotic types of atoms (and nuclei).

Together with measurements of gravitational waves, the studies at particle accelerators bring us closer to understand the neutron stars and uncover their structure.

Prof. Catalina Curceanu was born in Transilvania, near Dracula's castle. She is senior researcher at the National Institute of Nuclear Physics, Frascati National Laboratories, Italy, where she leads a group of 20 researchers, whom she refers to as the "Universe's explorers", performing research in experimental strangeness nuclear physics and in quantum foundation in Italy (on the DAFNE matter-antimatter collider at Frascati and at the Gran Sasso underground laboratories) and in Japan (J-PARC). Prof. Catalina is spokesperson of two international collaborations: SIDDHARTA-2 and VIP-2. She is leading various international and national projects, both in fundamental physics and in technological developments with societal applications. Prof. Catalina is member of the American Foundational Question Institute (FQXi), was named Knight of Romania with the Order of "Cultural Merit" and in 2017 she was recived the Emmy Noether Award from the European Physical Society. She organized dozens of international conferences and is the author of more than 400 scientific publications in international peer-reviewed journals. Prof. Curceanu published the book: From Black Holes to Hadrotherapy. A trip into the Modern Physics (in Italian, Springer - I Blu) and writes for various Italian and Romanian newspapers and magazines. Her passion? Explaining to everyone how beautiful and fascinating the science is.