Freie Universität Berlin

Einladung zum Vortrag

Compact Ultra-dense Object (CUDO) Impacts

Prof. Johann Rafelski
University of Arizona

Donnerstag, 11 July 2013, 10:30 Uhr
Haus C Hörsaal 011
GeoCampus Lankwitz, Malteserstraße 74-100, Bus X83

Der Vortrag dauert 45 min und findet in englischer Sprache statt.

Einladender: Patrick McGuire (patrick.mcguire@fu-berlin.de)

What if there are `dark' matter meteor and asteroid-like bodies in the Universe? Could some of them have collided with solar system bodies and the Earth? CUDOs' high density of gravitating matter provides the distinct observable difference in the outcome of their collisions with rocky bodies, the surface-penetrating puncture, with only a fraction of the kinetic energy damaging the solid surface: the CUDO will practically always enter the target body, and many will exit the body -- such impacts are `punctures'. CUDOs can be fragments of quark matter or made from TeV-scale dark matter particles. CUDOs cores can be enclosed by comets, providing unexpected stability of (some) of these objects on impact. I will argue that the hypothesis of a CUDO core helps resolve issues challenging the understanding of a few selected `recent' Earth impacts.

References:

Compact Ultra Dense Matter Impactors
Johann Rafelski, Lance Labun, Jeremey Birrell
Published in Phys.Rev.Lett. 110 (2013) 111102
http://dx.doi.org/10.1103/PhysRevLett.110.111102

Compact Ultradense Objects in the Solar System
J. Rafelski, Ch. Dietl, L. Labun.
Published in Acta Phys.Polon. B43 (2012) 12, 2251-2260
http://dx.doi.org/10.5506/APhysPolB.43.2251

BIO:

Johann Rafelski received his Ph.D. in 1973 working with Walter Greiner in Frankfurt/M addressing the QED of Strong Fields and Positron Production, Muonic Atoms. The following years he worked at: the University of Pennsylvania; Argonne National Laboratory, Chicago; NIST-Washington DC; and CERN-Geneva where his interests expanded to the understanding of quark confinement phenomena and the possibility of formation of a new quark-gluon plasma deconfined phase of matter. His postdoctoral advisers were John S. Bell, John W. Clark, Michael Danos, Rolf Hagedorn, and Abraham Klein. In the fall of 1979 he was appointed tenured assoc. Professor of Theoretical Physics (C3) in Frankfurt where he developed the idea of strangeness production as a signature of quark-gluon plasma and antiproton interactions with nuclei. He accepted a Chair in Theoretical Physics at the University of Cape Town (South Africa) in 1983, founding a Theoretical Physics and Astrophysics Institute, before arriving in Tucson, Arizona in the fall of 1987. His current research work encompasses the above main themes and he further embraces themes in cosmology, and astroparticle physics that relate to his nuclear and particle work. His strong field physics interest led to his participation in research opportunities involving the ultra short, ultra intense laser pulses in the exploration of strong field vacuum structure with applications to high energy particle production and fusion research. Rafelski lives in Tucson, AZ, his home for the past 26 years. He is affiliated with the CERN laboratory, and Ecole Polytechnique Paris.