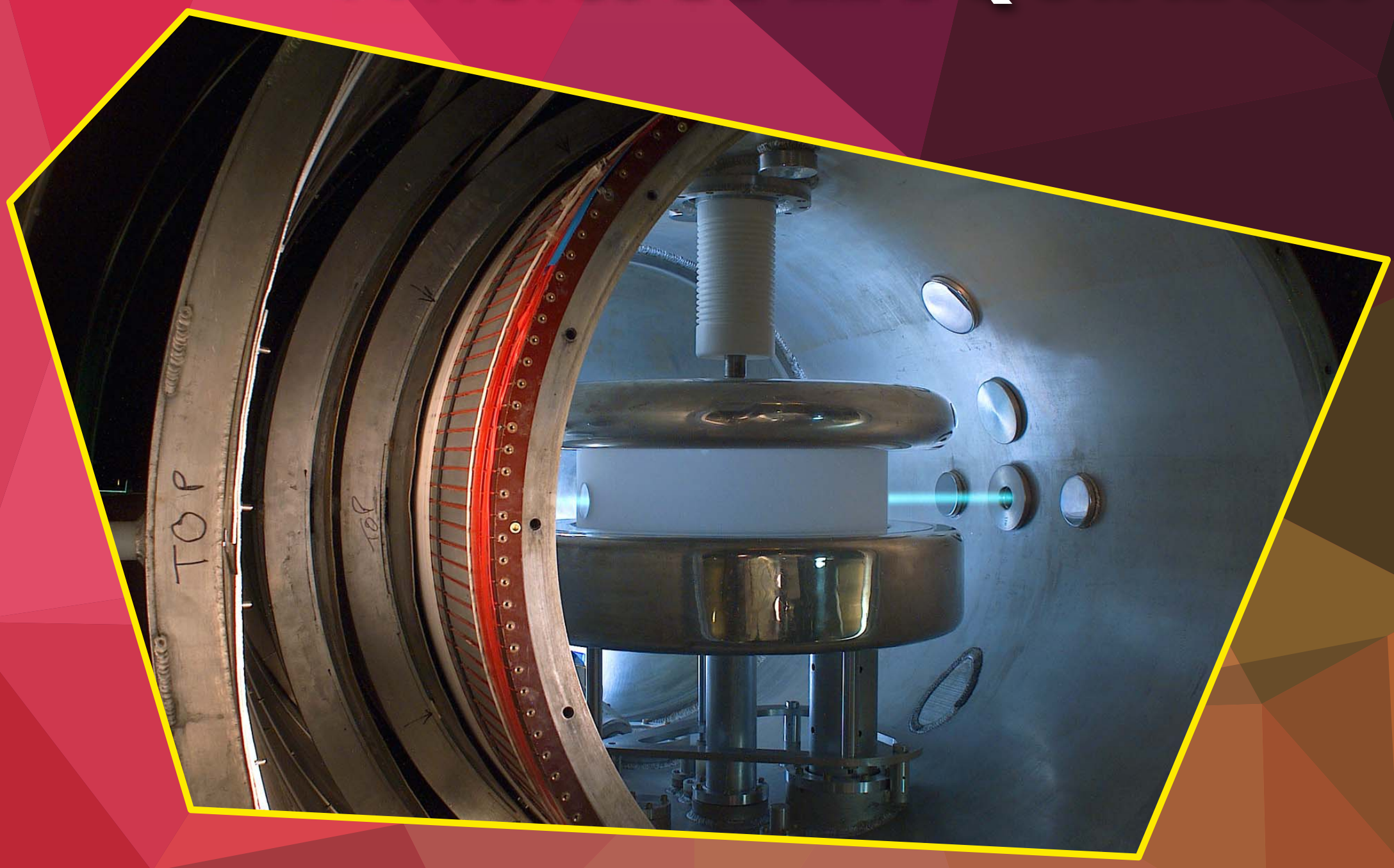
PHYSICS**COLLOQUIA**2020



Due to their outstanding property to be storable and hence observable for long periods of time (several hundreds of seconds) in suitable material or magnetic traps, ultra-cold neutrons (UCN) with energies around 100 neV are an unique tool to study fundamental properties of the free neutron, like its beta-decay lifetime, its electric dipole moment and its wave properties. The search for the electric dipole moment (EDM) of the neutron plays a prominent role in particle physics because of its direct bearing on P and T violation: a non-zero value of the neutron EDM would be evidence of CP violation. Precision measurements of the neutron lifetime provide stringent tests of the standard electroweak model as well as crucial inputs for tests of Big-Bang nucleosynthesis.
Neutron lifetime can be related to CKM Matrix unitarity. Neutron lifetime also dominates the uncertainty in theoretical calculation of primordial ^{4}He.
After the observation of quantum states of UCN in the gravitational potential of the Earth, a new powerful resonance spectroscopy technique has been established.
It allows precision experiments as tests of the equivalence principle and Newton's gravity law at the micrometre scale.
In this talk, current experiments linked to these fundamental questions are presented and an outlook is given.
The Institut Laue-Langevin (ILL) in Grenoble, France, which is a world leader in academic research with neutrons will be briefly introduced.

12 05

Peter Geltenbort | Institut Laue-Langevin, Grenoble, Francia

PROBING EARLY UNIVERSE PARTICLE PHYSICS WITH NEUTRONS

UNIVERSITÀ DEGLI STUDI DI MILANO
DOTTORATO DI RICERCA IN FISICA
ASTROFISICA E FISICA APPLICATA

Gli incontri si terranno alle **ore 14:30**
nell'**aula A** del **DIPARTIMENTO DI FISICA**
via Celoria 16 | 20133 MILANO
Tel. +39 02 50317740
http://phd.fisica.unimi.it | phd@fisica.unimi.it

progetto grafico: roberto perego | www.nonacaso.it