



Contribution ID: 71

Type: **not specified**

## Testing foundations of quantum mechanics in the neutral K-meson system

*Tuesday, 7 December 2010 14:50 (35 minutes)*

The high performance detector KLOE at the upgraded DAPHNE machine allows not only for precision measurements to test very fundamental questions in Particle Physics but as well to test foundations of quantum mechanics itself (G. Amelino-Camelia et al, Physics with the KLOE-2 experiment at the upgraded DAPHNE. Europ. Phys. J. C 68, No. 3-4, 619, 2010). In this talk I will show how the neutral K-mesons adds novel insights into the very working of quantum theory and discuss future possible tests which can/will be performed at KLOE 2. In particular, I will discuss how different the manifestation of nonlocality in the neutral kaon system is compared to usual considered quantum systems and how it is related to the violation of the CP symmetry, which models testing deviations from the standard quantum mechanical evolution can be ruled out by experimental data and I will motivate why the kaonic quantum eraser (part of the programme of KLOE 2) is interesting.

**Primary author:** Dr HIESMAYR, Beatrix C. (• Research Center for Quantum Information, Institute of Physics, Slovak Academy of Sciences)

**Presenter:** Dr HIESMAYR, Beatrix C. (• Research Center for Quantum Information, Institute of Physics, Slovak Academy of Sciences)

**Session Classification:** CPT and Lorentz symmetries, QM (1)

**Track Classification:** CPT symmetry, decoherence, Lorentz symmetry breaking