ELPH seminar

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日時：平成 30 年 11 月 21 日（水）１５：００～１６：３０

場所：電子光理学研究センター　三神峯ホール

題目： SIDDHARTA-2 experiment at DAFNE: ready for the first measurement of kaonic deuterium
（on behalf of SIDDHARTA & SIDDHARTA-2 collaborations）

概要:
The investigation of light kaonic atoms, in which one electron is replaced by a negatively charged kaon, is a unique tool to provide precise information on the kaon nucleon interaction and it still lacks, nowadays, of the most important measurement, namely the determination of the kaonic deuterium 2p→1s transition energy shift and width induced by the kaon-nucleus hadronic interaction. These parameters can be determined with high precision from the atomic X-ray spectroscopy, providing unique information to understand the low energy kaon-nucleus interaction at the production threshold. In particular, the lightest atomic systems, like the kaonic hydrogen and the kaonic deuterium deliver, in a model-independent way, the isospin-dependent kaon-nucleon scattering lengths. The most precise kaonic hydrogen measurement to-date, together with an exploratory measurement of kaonic deuterium, were carried out in 2009 by the SIDDHARTA collaboration at the DAFNE electron-positron collider of LNF-INFN, combining the excellent quality kaon beam delivered by the collider with new experimental techniques, as fast and very precise X-ray detectors, like the Silicon Drift Detectors. The SIDDHARTA results triggered new theoretical work, which achieved major progress in the understanding of the low-energy strong interaction with strangeness reflected by the antikaon-nucleon scattering lengths calculated with the antikaon-proton amplitudes constrained by the SIDDHARTA data. The most important and missing measurement of the kaonic deuterium, still today unperformed due to a very low yield of its 2p→1s transition, will in the near future performed by the SIDDHARTA2 experiment, thanks to major upgrades of the SIDDHARTA setup, with the introduction of new and more performant detectors and background reduction tools. In this talk, the results obtained in 2009 and the proposed SIDDHARTA-2 upgrades are presented, together with future perspectives on possible precision measurements with TES and Von Hamos spectrometer technologies.

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