

## Hadron Physics at KLOE and KLOE-2

Friday, 29 July 2016 14:15 (35 minutes)

The KLOE experiment has collected 2.5 fb<sup>-1</sup> at the peak of the  $\phi$  resonance at the e<sup>+</sup>e<sup>-</sup> collider DAPHNE in Frascati. A new beam crossing scheme, allowing for a reduced beam size and increased luminosity, is currently operating at DAPHNE. The upgraded detector, named KLOE-2, has already collected 2.0 fb<sup>-1</sup> in these new operating conditions, aiming to reach at least 5 fb<sup>-1</sup> in the next two years. The physics program is mainly focused on the study of low energy hadron decays as well as on neutral kaon interferometry, test of discrete symmetries, and search for physics beyond the Standard Model. The analysis of KLOE data is still in progress. The large data sample of light meson available provides precision measurements on decay dynamics, transition form factors and searches of new physics. Recent results on  $V \rightarrow \rho \gamma$  Dalitz decays and  $\eta \rightarrow \pi^+ \pi^- \pi^0$  dynamics will be presented. The analysis of the  $\phi \rightarrow \eta$  e<sup>+</sup>e<sup>-</sup> channel provides the most precise measurement of the transition form factor (TFF), while for the  $\phi \rightarrow \pi^0$  e<sup>+</sup>e<sup>-</sup> decay the TFF has been measured for the first time. The Dalitz plot density of the  $\eta \rightarrow 3\pi$  decay is sensitive to all cubic terms of the polynomial expansion in the normalized dimensionless variables  $X$  and  $Y$ , providing an improvement of a factor two on the statistical uncertainty of all parameters with respect to earlier experiments and smaller systematic uncertainties. Perspectives on hadron physics with KLOE-2 data will be also presented. In particular, the new four stations installed to tag electrons and positrons from the reaction  $e^+e^- \rightarrow e^+e^- \gamma \gamma \rightarrow e^+e^- X$ , will give the opportunity to investigate  $\gamma\gamma$  physics at the  $\phi$  resonance. Single pseudoscalar production will improve the determination of the two-photon decay widths of these mesons. An accuracy of 1% for the  $\pi^0$  is reachable with 5 fb<sup>-1</sup>, matching the current theory precision. With the same amount of data, the measurement of the  $\pi^0 \rightarrow \gamma \gamma$  TFF in the space-like region with 5-6% accuracy could be reached in a region not yet exploited of the low momentum transfer.

**Presenter:** BLOISE, Caterina (INFN)

**Session Classification:** Mesons