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## Latest KLOE results on hadron physics (15' + 5')

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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 now operating at DAPHNE. The upgraded detector, named KLOE-2, has already collected 1.3 fb<sup>-1</sup> in these new operating conditions. In the meanwhile, analysis of KLOE data is still in progress, providing new important results in the light meson sector.

The V → P gamma Dalitz decays, associated to internal conversion of the photon into a lepton pair, are not well described by the Vector Meson Dominance (VMD) models, as in the case of the process omega → pi<sup>0</sup> mu<sup>+</sup> mu<sup>-</sup>, measured by the NA60 collaboration. The only existing data on phi → eta e<sup>+</sup> e<sup>-</sup> come from the SND experiment, which has measured the Mee invariant mass distribution on the basis of 213 events. At KLOE, a detailed study of this decay has been performed using eta → pi<sup>0</sup> pi<sup>0</sup> pi<sup>0</sup> final state. Simple analysis cuts provide clean signal events, with a residual background contamination of 2-3%. We obtain the measurement of the branching fraction for the process phi → eta e<sup>+</sup> e<sup>-</sup>, with an accuracy improved by a factor of five with respect to the previous most precise measurement, and the transition form factor, which is in agreement with VMD expectations. We have also new results for the decay phi → pi<sup>0</sup> e<sup>+</sup> e<sup>-</sup>, where no data are available on transition form factor. Dedicated analysis cuts strongly reduce the main background component of Bhabha events to ~20%, leading to ~4000 signal events in the whole KLOE data set. These events have been used to obtain the first measurement of the phi pi<sup>0</sup> transition form factor and the most precise determination of the branching fraction.

KLOE data have been also exploited to obtain a new, precise results on the isospin-violating decay eta → pi<sup>+</sup> pi<sup>-</sup> pi<sup>0</sup>, sensitive to the light-quark mass ratio. This study, overpassing in precision previous results published by KLOE in 2008, aims to a better determination of the light-quark mass ratio through the dispersive analysis of the eta → 3 pi decay, following theoretical works as Leutwyler, Mod.Phys.Lett. A28 (2013) 1360014. The new analysis, performed with an independent and larger data set (1.7 fb<sup>-1</sup>), a new analysis scheme and improved Monte Carlo simulation, determines with very good accuracy the parameters of the decay matrix element. The Dalitz plot density is parametrized as a polynomial expansion up to cubic terms in the normalized dimensionless variables X and Y. The experiment is sensitive to all charge conjugation conserving terms of the expansion, providing an improvement of a factor of two on the statistical uncertainty of all parameters with respect to earlier experiments. Smaller systematic uncertainties, which are in some cases reduced by a factor two or three, have been also achieved.

**Presenter:** MORICCIANI, Dario (INFN RM2)

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