Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Search for Kaonic Nuclear Clusters in Nuclear Collisions with FOPI KEN SUZUKI, LAURA FABBIETTI, Technische Universität München, MICHAEL CARGNELLI, PAUL KIENLE, JOHANN MARTON, JOHANN ZMESKAL, Stefan Meyer Institut, Vienna, NORBERT HERRMANN, University of Heidelberg, TOSHIMITSU YAMAZAKI, RIKEN, FOPI COLLABORATION — Recently, exotic nuclear systems involving a $\bar{K}$, (K^- or $\bar{K}^0$) as constituent (such as ppK^-, $ppnK^-$, $pppK^-$, $pppnK^-$ and $ppnnK^-$) were predicted by Akaishi and Yamazaki to have narrow discrete bound states with large biding energies as much as 100 MeV due to the strong $K^- - p$ attraction, which may lead the system to have a much higer density than normal nuclear density. We produce and identify such $\bar{K}$ clusters in heavy-ion collision or proton induced reactions by making use of the capability of the FOPI detector at GSI which is enable to reconst invariant-mass from all the charged trajectories of the decay particles of K clusters such as $ppK \rightarrow \Lambda + p$, $ppnK \rightarrow \Lambda + d$ and $pppK \rightarrow \Lambda + p + p$. ppK^- is produced with proton induced reaction on d target as $p + d \rightarrow [\Lambda(1405) + p] + K^0 + p \rightarrow ppK^- + K^0 + p$, where $\Lambda(1405) \equiv pK^-/n\bar{K}^0$ works as a doorway to form $\bar{K}$ cluster. We can identify the ppK^- in the missing mass spectrum, and simultaneously study its decay pattern by invariant mass method. With light nuclear target more heavier $\bar{K}$ clusters can be produced by $\Lambda(1405)$ production and successive $\bar{K}$ transfer / knock-on reactions.

Ken Suzuki
Technische Universität München

Date submitted: 03 Jun 2005 Electronic form version 1.4