DEAR - Kaonic Hydrogen: First Results

G. Beer[i], A.M. Bragadireanu[a,e], **M. Cargnelli[d],** C. Curceanu (Petrascu)[a,e], J.-P. Egger[b,c], H. Fuhrmann[d], C. Guaraldo[a], M. Iliescu[a], T. Ishiwatari[d], K. Itahashi[g], M. Iwasaki[f], P. Kienle[d], B. Lauss[h], V. Lucherini[a], L. Ludhova[b], J. Marton[d], F. Mulhauser[b], T. Ponta[a,e], L.A. Schaller[b], R. Seki[j,k], D. Sirghi[a], F. Sirghi[a], P. Strasser[f] , J. Zmeskal[d]

[a]INFN - Laboratori Nazionali di Frascati; [b]Universite de Fribourg; [c]Universite de Neuchâtel; [d]Institute for Medium Energy Physics, Vienna; [e]Institute of Physics and Nuclear Engineering, Bucharest; [f]RIKEN, Saitama; [g]Tokyo Institute of Technology; [h]University of California and Berkeley; [i] University of Victoria; [j]California Institute of Technology; [k]California State University

The DEAR[1] experiment [1] measures the energy of X-rays emitted in the transitions to the ground states of kaonic hydrogen. The shift ϵ and the width Γ of the 1s state are related to the real and imaginary parts of the complex S-wave scattering length by the Deser Trueman formula.

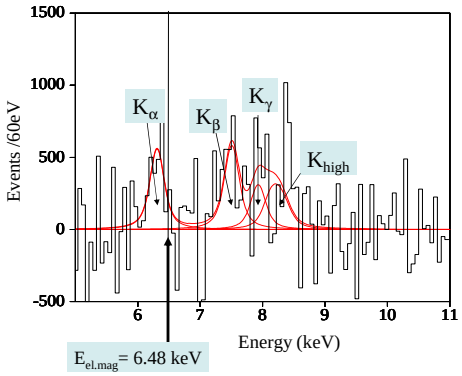

Figure 1: Background subtracted energy spectrum of kaonic hydrogen X ray transitions.

The preliminary results are: ϵ= - 202 $\pm$ 45 eV and Γ= 250 $\pm$ 138 eV. Both values are smaller then those from the previous experiment [2] and consistent with recent theoretical studies [3].

Part of the work was supported by "Transnational access to Research Infrastructure" (TARI) Contract No. HPRI-CT-1999-00088.

References

[1] S. Bianco et al., Rivista del Nuovo Cimento 22, No.11, (1999), 1.

[2] M. Iwasaki et at., Phys. Rev. Lett. 78 (1997), 3067.

[3] A. Ivanov et al., submitted to Eur. Phys. J. A, nucl-th/0310081.

[1]DAΦNE Exotic Atom Research, conducted at the Frascati electron positron collider