REPORTS ON RESEARCH

8.1   Review of Selected Topics in Hypernuclear Physics
by J.Dąbrowski

A critical review of hypernuclear physics was prepared. In particular the uncertain accuracy of the LOB (Low Order Brueckner) results for hyperon binding in nuclear matter was stressed, and a theoretical description of the production of Sigma hypernuclear states in the inclusive (K-,π+) reaction was discussed [1], [2].

[1]   J.Dąbrowski:"Selected Topics in Hypernuclear Physics", in European Conference on Advances in Nuclear Physics and Related Areas, Thessaloniki, Greece, 8-12 June 1997, Abstracts, p.28, and Proceedings - in press

[2]   J.Dąbrowski,"Hypernuclear Physics - an Overview", in Condensed Matter Theories, Vol.12, Eds.J.da Providencia and B.Malik, Nova Science Publishers, Comack, N.Y. - in press

8.2   Poles of the S-matrix for a Complex Square Well Potential
by J.Dąbrowski

The possible connection between the Σ hypernuclear resonances and the poles (in the complex k plane) of the S matrix for the Σ single-particle optical potential was the starting point for a detailed discussion of the trajectories of these poles. The assumed square well shape of the potential leads to analytical expressions for the S matrix. When the absorption increases, the poles, - in agreement with a simple criterion, - tend either to a finite limit or to infinity. In a preliminary discussion, the case was considered also when the S optical potential was replaced by two coupled channels Σ and Λ. [1], [2]

[1]   J.Dąbrowski: "Poles of the S-matrix for a Complex Square Well Potential", Journal of Physics G: Nucl.Part.Phys. 23, 1539 (1997)

[2]   J.Dąbrowski: "Singularities of the S-matrix for a Complex Square Well Potential", Acta Physica Polonica B - in press

8.3   On the possible S.P. Nature of the Σ Hypernuclear States Produced in the (K-,π) Reaction
by J.Dąbrowski and J.Rożynek

The possibility of describing observed Σ hypernuclear states with positive energy in terms of a Σ single particle model is discussed. It is pointed out that the states may be explained as resonances of Σ in the s.p. potential with a repulsive bump near the nuclear surface, whose magnitude agrees with microscopic estimates [1].

[1]   J.Dąbrowski, J.Rożynek: "On the Possible S.P. Nature of the Σ Hypernuclear States Produced in the (K-,π) Reaction", Izv.V.U.Z. Fizika 40, No.10, 28 (1997)

8.4   Studies on Nuclear Masses and Radii
by Z.Patyk, A.Baran[1], J.F.Berger[2], J.Dechargé[2], J.Dobaczewski[3], J.Muntian, P.Ring[4], A.Sobiczewski

The quality of the description of nuclear masses and charge radii, calculated in various microscopic approaches, is studied. The Hartree-Fock-Bogoliubov, Extended Thomas-Fermi model with Strutinski Integral, Relativistic Mean Field and Macroscopic-Microscopic approaches are considered [1,2].