MP 13: Klassische Feldtheorie

Time: Wednesday 17:35–17:55   Location: HFT-FT 101

MP 13.1   Wed 17:35   HFT-FT 101

Gauged Hopfions and Baby Skyrmions — ●Yakov Shnir — BLTP JINR, Dubna, Russia — Carl von Ossietzky University Oldenburg, Germany

We discuss the U(1) gauged versions of the models from the Skyrme family in 2+1 dim and in 3+1 dim, the baby Skyrme model and the Faddeev-Skyrme model, respectively, supplemented by the Maxwell term. We show that there exist static solutions coupled to the non-integer toroidal flux of magnetic field, which revert to the usual baby Skyrmions and Hopfions of lower degrees $Q = mn$ in the limit of the gauge coupling constant vanishing. The masses of the static gauged configurations are found to be less than the corresponding masses of the usual ungauged solitons, they become lighter as gauge coupling increases. The dependence of the solutions on the gauge coupling is investigated. We find that in the strong coupling regime the gauged low-dimensional Skyrmion is coupled to a magnetic flux whereas an axially-symmetric Hopfion carries two magnetic fluxes, which are quantized in units of 2π, carrying n and m quanta respectively. The first flux encircles the position curve and the second one is directed along the symmetry axis. Effective quantization of the field in the gauge sector may allow us to reconsider the usual arguments concerning the lower topological bound.