MAGNETIC MOMENTS AND ELECTROMAGNETIC FORM FACTORS OF THE SU(3) OCTET BARYONS IN SEMIBOSONIZED SU(3) NAMBU-JONA-LASINIO MODEL

H.-C. Kim, M. V. Polyakov, A. Blotz, K. Goeke

We investigate the magnetic moments and electromagnetic form factors of the SU(3) octet baryons in the framework of the $SU(3)$ semibosonized Nambu–Jona–Lasinio model. The rotational $1/N_c$ corrections and strange quark mass in linear order are taken into account (chiral quark-soliton model). We derive general relations between magnetic moments of the SU(3) octet baryons, based on the symmetry of our model. These relations indicate that higher order corrections such as $O(m_s/N_c)$ and $O(m_s^2)$ are relatively small. The magnetic moments of the octet baryons predicted by our model are quantitatively in a good agreement with experimental results within about 15%. The electromagnetic charge radii of nucleon are also evaluated and also are in good agreement with experimental data.

REFERENCE

Kim H.-C., Polyakov M.V., Blotz A., Goeke K. Preprint RUB-TPII-7/95 to appear in Phys.Rev.D.

SPHALERON TRANSITIONS IN THE MINIMAL STANDARD MODEL AND THE UPPER BOUND FOR THE HIGGS MASS

D. Diakonov, M. Polyakov, P. Sieber, J. Schaldach, K. Goeke

We calculate the dissipation of the baryon number after the electroweak phase transition due to thermal fluctuations above the sphaleron barrier. We consider not only the classical Boltzmann factor but also fermionic and bosonic one-loop contributions. We find that both bosonic and especially fermionic fluctuations can considerably suppress the transition rate. Assuming the Langer–Affleck formalism for this rate, the condition that an initial baryon asymmetry must not be washed out by sphaleron transitions leads, in the Minimal Standard Model ($\sin\theta_W = 0$), to an upper bound for the Higgs mass in the range 60 to 75 GeV.

REFERENCE

Diakonov D., Polyakov M., Sieber P., Schaldach J., Goeke K. Preprint RUB-TPII-25/95 to appear in Phys.Rev.D.