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The D-term of Exploding Q-Balls MICHAEL CANTARA, PETER SCHWEITZER, Univ of Connecticut - Storrs — Form factors of the energy momentum tensor contain essential information on the considered particle such as mass, spin, and a property called D-term. Although it is experimentally unknown, the D-term is a particle property as fundamental as mass, spin, electric charge or magnetic moment. Only very recently it became clear how the D-term of the nucleon can in principle be studied in hard exclusive reactions like deeply virtual Compton scattering or hard meson production. But present data do not yet allow an unambiguous determination of the D-term of nucleons or nuclei. Meanwhile the only source of information are theoretical studies. Interestingly, in all calculations (in models, effective theories) the D-terms of various particles (pions, nucleons, nuclei, photons) were always found to be negative. The deeper reason for this was recently elucidated in a study of Q-balls in scalar field theories with U(1) symmetry: stable Q-balls must have a negative D-term. However, also meta-stable and even unstable Q-balls have negative D-terms. The emerging question is whether one can ever encounter a positive D-term in a physical situation. We show that this can indeed happen in the Q-ball system in the limit when unstable Q-balls dissociate into a Q-cloud, i.e. free and unbound Q-quanta.

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