# The Nature of Fission

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Radioactive fission processes remain among the most sought-after methods for energy production, yet they are still among the least understood. Fission induced by quark flavor transformations can occur spontaneously and depends on the density of the gluon field between interacting quarks, both within nucleons and in the inter-nucleon regions. Quark color also contributes to these transformations, regulating the attraction and repulsion between quarks. Such flavor changes represent a partial conversion of the gluon field into new fields - specifically, electromagnetic and gravitational - generated by a concentrated form of energy manifested as mass, with or without electric charge [1]. The fission Lagrangian proposed in this study describes nuclear fission processes both inside and beyond nucleons. In constructing this Lagrangian, we assume that the primary energy source is the gluon field, which can partially transform into electromagnetic or gravitational fields, leading to the creation of new particles with non-zero mass and, possibly, electric charge. It is essential to define the energy source, the limiting conditions for mass accumulation, and the moment when this process concludes. Symmetry breaking and transformations within the gluon field offer valuable insight into the fundamental laws of physics [2]. The main challenge lies in understanding how gluon field energy converts into mass and how gravitational and electromagnetic fields emerge from this process. This work aims to address these fundamental questions by introducing a Lagrangian model that describes the underlying mechanisms of radioactive fission and the transformation of gluon field energy into mass.

[1] Mommers J and Leupold S 2022 *Physical Review D* **106**(9) 093001
[2] Hurtado P and Garrido P L 2011 *Physical review letters* **107**(18) 180601