

## Free Quark Searches

Quarks are fractionally charged particles, the constituents of hadrons, with charges  $1/3 e$  or  $2/3 e$ . The charge of every known charged system is an integer multiple of  $1/3 e$ . Quantum Chromodynamics predicts that quarks cannot be observed as freely propagating particles, being confined inside hadrons or deconfined in quark-gluon plasma (QGP). We observe the top quark decaying as still free, because its lifetime is too short to allow its hadronization. Experiments have produced no evidence for free propagating quarks.

Reviews can be found in Refs. 1–5.

### References:

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4. M. Marinelli and G. Morpurgo, *Phys. Reports* **85**, 161 (1982).
5. L.W. Jones, *Rev. Mod. Phys.* **49**, 717 (1977).