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Exploring the partonic structure of the nucleon[1]

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The QCD structure of the basic building blocks of matter, protons and neutrons, is best described by partons – quarks and gluons – in the infinite momentum frame of the composite nucleons. While momentum distributions of partons can be studied through perturbative QCD processes, their spatial distibutions have been probed through elastic form factors. A significant breakthrough in recent years has been the realization that partons can be probed in both spatial and momentum spaces simultaneously, resulting in tomographic pictures in quantum-phase space. In this talk, progress and prospects in estabilishing the partonic picture of the nucleon are discussed from both theoretical and experimental points of view. Discussions are also made about the origin of mass and the spin structure of the nucleon.

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