A Polar Orbiter to Probe Jupiter's Deep Atmosphere, Interior Structure and Polar Magnetosphere

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The recent National Academy of Sciences Decadal Survey for Solar System Exploration recommended a Jupiter polar orbiter with deep probes as one of the new missions to consider for NASA's New Frontiers program. The report identified five key questions related to solar system formation and evolution that require a Jupiter polar orbiter; (1) determine whether Jupiter has a core, (2) measure the global oxygen and nitrogen abundance in Jupiter, (3) map the high order Jovian magnetic field, (4) explore the Jovian polar magnetosphere, and (5) investigate Jupiter's deep winds and internal convection. Additionally, the Committee for Solar and Space Physics in their National Academy Decadal survey also recommended a Jupiter polar orbiter mission to explore the Jovian polar magnetosphere and aurora.

In this paper, we describe a Jupiter polar orbiter mission that addresses both the Solar System Exploration and Solar and Space Physics decadal surveys recommendations. Using a combination of gravity and magnetic field observations, microwave radiometry, in-situ fields and particles, and remote sensing, the mission can help to answer the above referenced key scientific questions. An overview of mission design, science payload, and measurement requirements will be presented. The mission will be proposed as a candidate for NASA's New Frontiers program.

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