## P320b セドナ型新天体「Ammonite」の発見と軌道ダイナミクス：太陽系外縁部への力学的窓

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Distant trans-Neptunian objects (TNOs), those with perihelion distances greater than 60 au and semimajor axes exceeding 200 au, offer vital clues about the early evolution of our solar system and the potential existence of a distant, undiscovered planet. Due to their extreme distance, these objects are difficult to detect, making each discovery significant for refining models of solar system formation. Here, we present the discovery of 2023 KQ14, nicknamed 'Ammonite,' a new Sedna-like TNO. Ammonite possesses a perihelion distance of 66 au, a semimajor axis of 252 au, and an inclination of 11 degrees. Interestingly, Ammonite's orbit stands apart from other known Sedna-like objects, filling a previously unexplained "q-gap" in the distribution of distant solar system objects. Through simulations, we confirmed Ammonite's orbital stability for at least 4.5 billion years. Our findings suggest that Ammonite and other Sedna-like objects may have once shared a common orbital clustering approximately 4.2 billion years ago. Furthermore, Ammonite's stable orbit indicates that a hypothetical super-Earth massed planet in the outer solar system would need to have a larger orbit (around 500 au) rather than a closer one.