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Are Uranus and Neptune really ice giants?

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Although Uranus and Neptune are commonly classified as ice giants, their exact compositions remain uncertain. Recent studies on outer solar system objects challenge the traditional view that these planets are primarily icy, suggesting the idea of a rock-dominated composition. Determining the proportions of ice and rocks within Uranus and Neptune is essential for understanding their formation and the broader history of the solar system. In this work, we calculate interior structure models for Uranus and Neptune. We explore the range of structure models that meet observational constraints, assessing ice and rock fractions and analyzing their impact on the planets interior. Our results suggest that Neptune's envelope is rock-enriched, with a minimum rock fraction of around 60%, while its mantle may contain more ices. For Uranus, models with larger ice fractions (over 50%) are needed to fit the radius and gravity data. These differences between Uranus and Neptune suggest possible distinct formation and evolution paths.