

P319a A Search for Planet Nine with IRAS and AKARI Data

Terry Long Phan, Tomotsugu Goto, Issei Yamamura, Takao Nakagawa, Amos Y.-A. Chen, Cossas K.-W. Wu, Tetsuya Hashimoto, Simon C.-C. Ho, Seong Jin Kim

The outer solar system is theoretically predicted to harbor an undiscovered planet, often referred to as Planet 9. Simulations suggest that its gravitational influence could explain the unusual clustering of minor bodies in the Kuiper Belt. However, no observational evidence for Planet 9 has been found so far, as its predicted orbit lies far beyond Neptune, where it reflects only a faint amount of Sunlight. This work aims to find Planet 9 candidates by taking advantage of two far-infrared all-sky surveys, which are IRAS and *AKARI*. The epochs of these two surveys were separated by 23 years. We use a dedicated AKARI Far-Infrared point source list for the purpose of our Planet 9 search — AKARI-FIS Monthly Unconfirmed Source List (AKARI-MUSL), which includes sources detected repeatedly only in hours timescale, but not after months. We search for objects that moved slowly between IRAS and *AKARI* detections given in the catalogues. We produced all possible candidate pairs including one IRAS source and one *AKARI* source whose angular separations were limited between $42'$ and $69.6'$, corresponding to the heliocentric distance range of 500 – 700 AU and the mass range of $7 - 17M_{\oplus}$. There are 13 candidate pairs obtained after the selection criteria. After image inspection, we found one good candidate, of which the IRAS source is absent from the same coordinate in the *AKARI* image after 23 years and vice versa.