

## Poster Presentation

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### *Intermediate-valence Yb-based quasicrystals and approximants*

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We are searching for intermediate-valence (IV) quasicrystals where IV ions are quasi-periodically arranged. Our previous study revealed that an icosahedral Au-Al-Yb quasicrystal forms an IV system [1]. X-ray absorption spectroscopy near the Yb L<sub>3</sub> edge indicated that the Yb ions in the quasicrystal assume a mean valence of 2.61, between a divalent state (4f<sup>14</sup>, J = 0) and a trivalent one (4f<sup>13</sup>, J = 7/2). Additionally we found that non-Fermi-liquid behaviour appears at low temperatures without doping, pressure, or field tuning. In this study we examined Au-M-Yb system, where M = Sn, Ge, and Ga. X-ray absorption spectroscopy measurements at SPring-8 (BL22XU) showed that each compounds forms IV system. The Yb valence values are respectively 2.27 for a Au-Sn-Yb 2/1 crystalline approximant, 2.24 for a Au-Ge-Yb 1/1 approximant, and 2.36 for a Au-Ga-Yb 1/1 approximant. By following the trend of Yb-based IV compounds, these valence values close to divalent suggest that the Yb 4f character in these compounds would be itinerant rather than localized one.

[1] T. Watanuki, S. Kashimoto, D. Kawana, et al., *Phys. Rev. B*, 2012, 86, 094201

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