

Title: Electron properties of the substituted cerium compounds

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Abstract: The subject of this work is the study of vibron states in tetragonal CeCuAl_3 and CePd_2Al_2 compounds and their development with the substitution of constituent elements. After the preparation of single crystals and polycrystalline samples, the careful chemical and structural characterization was done. The structural, magnetic and superconducting phase transitions in samples were observed and thoroughly investigated. The crucial experiments were performed using the elastic and inelastic neutron scattering techniques leading to the refinement of magnetic structures in CeCuAl_3 , CePd_2Al_2 and CePd_2Ga_2 . The energy spectra of substituted $\text{Ce}(\text{Cu},\text{Al})_4$ and $\text{CePd}_2(\text{Al},\text{Ga})_2$ compounds were studied as well allowing to determine the crystal field excitations and their interaction with phonons (vibron states) in these materials.

Keywords: cerium intermetallic compounds, vibron states, electronic properties, neutron scattering