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Novel Features in the Mixed-Valence State of TmTe at High Pressure: A Resonant Inelastic X-ray Scattering Study IGNACE JARRIGE, YONG CAI, HIROFUMI ISHII, NOZOMU HIRAOKA, CHIEN-TE CHEN, National Synchrotron Radiation Research Center, Taiwan, JEAN-PASCAL RUEFF, Synchrotron Soleil, France, SEAN SHIEH, National Cheng Kung University, Taiwan, CHING-PAO WANG, National Cheng Kung University, Taiwan, TAKESHI MATSUMURA, Tohoku University, Japan — Using resonant inelastic x-ray scattering, the mixed-valence state of TmTe under pressure is accurately determined up to 10.6 GPa. A remarkable interplay between electronic, magnetic and structural properties in TmTe under pressure is inferred throughout the considered pressure range. A nearly linear correlation is found between the pressure dependences of the valence and the volume in the metallic regime of TmTe. In the framework of the RKKY theory, the pressure dependence of the valence is found to explain both the steady decrease of the ferromagnetic state with increasing pressure in the 2-6 GPa range and the formation of the antiferromagnetic state above 6 GPa.

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