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Pressure-induced exotic states in mixed-valence rear earth hexaborides LILING SUN, YAZHOU ZHOU, QI WU, YI-FENG YANG, ZHONGXIAN ZHAO, Institute of Physics, CAS, DAE-JEONG KIM, PRISCILA ROSA, ZACHARY FISK, Department of Physics and Astronomy, University of California, Irvine, RONG YU, Department of Physics, Renmin University of China, QIMAO SI, Department of Physics Astronomy, Rice University, Houston, JOE THOMPSON, Los Alamos National Laboratory, Los Alamos — Recently, a unique type of well-known compounds, mixed-valence rear earth hexaborides RB_6 ($R = \text{Sm}$ and Yb), receive new interests due to the discovery of the coexistence of metallic surface state and insulating bulk state in SmB_6 . This encourages people to revisit the RB_6 with an attempt to establish a new physics that links the correlated electron systems and topological insulators. Pressure is a way to help understanding the underlying mechanism, therefore it is specially needed in establishing this link because the valence state of RB_6 is sensitive to pressure. In this talk, we will report some progress of high pressure studies on the RB_6 , mainly focusing on the phenomena of pressure-induced exotic states and corresponding quantum phase transitions. The connections between the related phenomena and the valence states are revealed.

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