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## ABSTRACT:

### Exotic Borides Under Extreme Conditions

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Intermetallic binary boron compounds are modeling systems for study of superconductors ( $\text{MgB}_2$ ,  $\text{YB}_6$ ,  $\text{ZrB}_{12}$ ,  $\text{LuB}_{12}$ ), topological Kondo insulators ( $\text{SmB}_6$ ,  $\text{YbB}_6$ ,  $\text{YbB}_{12}$ ), heavy fermion or amplitude-modulate antiferromagnets ( $\text{CeB}_6$ ,  $\text{HoB}_{12}$ ) as well as frustrated Shastry-Sutherland magnets ( $\text{TmB}_4$ ,  $\text{HoB}_4$ ). External control parameters, such as high pressure or magnetic field at very low temperatures, can tune the ground state of these strongly correlated electron systems from one to another, which is known as the quantum phase transition. In brief review, mainly new high pressure studies will be presented together with discovery of dynamic charge stripes (nanoscale electronic instabilities), which are responsible for charge transport and magnetization anisotropy in studied borides.

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[1] S. Gabáni et al., *J. Alloys and Comp.*, 821, 153201 (2020).

[2] N. Shitsevalova, N.B. Bolotina, N.E. Sluchanko, T. Matsumura et al., in *Rare-Earth Borides*, edited by D.S. Inosov (Jenny Stanford Publishing, Singapore, 2021).