Abstract Submitted
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Pressure-enhanced superconductivity in A15-type Nb3Ge via increased Fermi surface nesting[1] RYAN STILLWELL, JASON JEFFRIES, SCOTT MCCALL, ZSOLT JENEI, SAM WEIR, Lawrence Livermore Natl Lab, YOGESH VOHRA, University of Alabama at Birmingham — The A15-type superconductors are the most widely used superconductors in industrial applications yet the physics behind maximizing the superconducting transition temperature is still not completely understood. The highest transition temperatures found to date have recently been reported for high-pressure hydride materials and it is believed that they too are BCS-type phonon-mediated superconductors, just like the A15-type superconductors. Understanding the electron-phonon coupling has therefore been brought front stage in the search to understand the mechanisms for optimizing high-temperature superconductors. Using a multi-faceted suite of high-pressure techniques we found that Nb3Ge has an isostructural phase transition at high pressure that correlates directly with a bandstructure change seen in high-pressure magnetotransport measurements. Our results suggest that A15-type superconductivity is not only phonon-mediated but that the degree of Fermi surface nesting is a controlling parameter for maximizing the superconducting transition temperature.

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