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Research opportunities in new superconducting materials¹

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Since the discovery of superconductivity 100 years ago, new superconducting materials have rarely successfully been designed, with almost every new superconductor being discovered serendipitously. Through the years we have developed a variety of guidelines based on observations, but some of these guidelines remain disparate - such as, reduced dimensionality seems to give rise to higher T_c but isotropic materials would be better for applications. It is encouraging to note that this is an area where physicists, chemists, and material scientists seamlessly work together without boundaries, and ideas between groups are exchanged freely. Just as the theory of superconductivity and its development has had a major impact on how we do theoretical physics, our approach, with consilience, in searching for “better” superconductors may change the way we do experimental physics. I will present some of our guidelines and how our approach will help to provide exciting new research opportunities in superconducting materials.

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