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Assembling, understanding, auguring phase diagrams for Fe-based superconductivity¹

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The quest for improved examples of novel, potentially useful, superconductors reached another milestone in 2008 with the discovery of Fe-based superconductivity in wide range of structurally related arsenide and selenide compounds. In particular, the AFe_2As_2 ($A = Ba, Sr, Ca$) compounds proved to have the highly desirable combination of intriguing properties that imply intimate coupling between electronic, magnetic and structural degrees of freedom, exceptionally high and relatively isotropic upper critical field curves and readily grown, homogeneous single crystals. Over the past three years the CMP community has been able to develop a broad and deep empirical understanding of substitutional and pressure based phase diagrams of these materials that is leading to theoretical as well as synthetic insights. In this talk I will broadly review some of our key findings and speculate about future directions for research in this field.

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