

Abstract Submitted  
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**Elucidating the magnetic and superconducting phases in  $\text{Rb}_x\text{Fe}_y\text{Se}_{2-z}\text{S}_z$ .** MENG WANG, MING YI, University of California, Berkeley, WEI TIAN, Oak Ridge National Laboratory, EDITH BOURRET-COURCHESNE, Lawrence Berkeley National Laboratory, ROBERT BIRGENEAU, University of California, Berkeley — The complex interdigitated phases have greatly frustrated attempts to document the basic features of the superconductivity in the  $A_x\text{Fe}_y\text{Se}_{2-z}\text{S}_z$  ( $A =$  alkali metals) system. We have employed elastic neutron scattering, energy-dispersive x-ray spectroscopy, and resistivity measurements to elucidate the relations of these phases in  $\text{Rb}_x\text{Fe}_y\text{Se}_{2-z}\text{S}_z$ . We find: i) the iron content is the driving parameter in stabilizing the structural separated phases; ii) the existence of the 245 antiferromagnetic phase stabilizes the iron vacancy free phase; iii) the sulfur substitutions progressively tune the iron vacancy free phase from a superconductor in  $\text{Rb}_x\text{Fe}_2\text{Se}_2$  to a metallic phase in  $\text{Rb}_x\text{Fe}_2\text{S}_2$ . Several phase diagrams as functions of the iron content and the Se:S ratio will be provided.

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