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**Substitution and doping in iron pnictides** M. MERZ, P. SCHWEISS, P. NAGEL, M.-J. HUANG, A. PLOG, R. EDER, TH. WOLF, H. V. LHNEYSEN, S. SCHUPPLER, Karlsruhe Institute of Technology — The composition-dependent electronic structure of iron pnictides, in particular the question if and how charge carriers are introduced to the system upon substitution – by Sr or alkali metals (*AM*) for Ba; by transition metals (*TM*) for Fe; and/or by P for As – continues to provide surprises. Our systematic study of spatial structure and electronic states by x-ray diffraction and x-ray absorption, performed on a large number of compositions in the  $(\text{Ba,Sr,AM})(\text{Fe, TM})_2(\text{As,P})_2$  family of compounds, shows, for instance, that valences are often different from expectations, that doping can be “effective” or not, depending on substituent, and that many doping effects are “site decoupled”, meaning that they occur *either* on the Fe site *or* on the As site but not on both simultaneously. Furthermore, the energy-level schemes derived from electronic and spatial structure differ from the present “standard” assumptions. In all, it appears that indirect, structural effects of substitution may in many cases be more important for magnetism and superconductivity in iron pnictides than direct, charge-carrier doping effects.

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