

Local magnetic cluster size identified by neutron total scattering in site-diluted spin-glass $\text{Sn}_x\text{Fe}_{4-x}\text{N}$ for $x=0.88$

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A detailed structure analysis for the site-diluted $\text{Sn}_x\text{Fe}_{4-x}\text{N}$ ($x = 0.25, 0.41, \text{ and } 0.88$) has been carried out through complex modeling of the neutron total scattering data. We present quantitative evidence showing the local ferromagnetic cluster size extending to $\sim 8 \text{ \AA}$ on average when $\text{Sn}_{0.88}\text{Fe}_{3.12}\text{N}$ undergoes the spin-glass transition (the other two not showing such transition). The modeling methodology used in this work involving the co-refinement of the nuclear and magnetic structure in both real and reciprocal space can potentially be applied generally to explore a variety of spin-glass material problems.

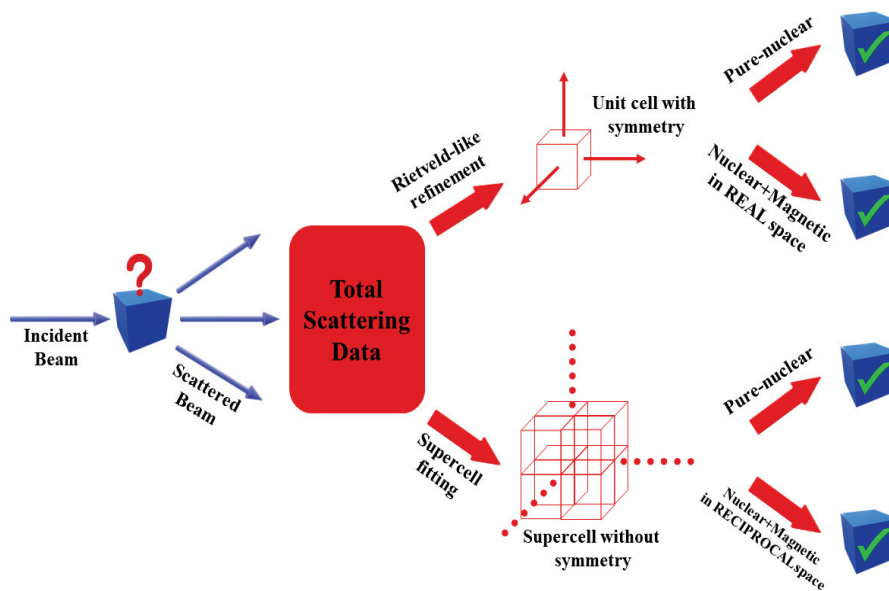


Fig. 1. Conceptual diagram showing the two different approaches for modeling the total scattering data.

References

- [1] Zhang, Y. P., *et al.* (2019), *Phys. Rev. B.*, under review.