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Single magneto-chiral domain observed in langasite $Ba_3NbFe_3Si_2O_{14}$ by non-resonant magnetic X-ray scattering LAURENT CHAPON, ALESSANDRO BOMBARDI, FEDERICA FABRIZI, CHRIS STOCK, DES MCMORROW, PAOLO RADAELLI, SANG-WOOK CHEONG — The helical magnetic ground state of the chiral langasite compound $Ba_3NbFe_3Si_2O_{14}$ has been investigated using a left-handed single crystal using non resonant x-ray magnetic scattering. This technique, when combined with circularly polarized x-ray and a full polarization analysis of the scattered beam, is sensitive to the chirality of the spiral order previously reported in this compound and it allows an unique determination of the chirality of the magnetic ground state. A topographic map of the sample surface shows that the crystal is made of a single magneto-chiral domain. Azimuthal scans revealed that the long range magnetic order with wave-vector k=(0,0,1/7) is characterized by an elliptical modulation rather than a circular one, as initially reported. We also discuss the possible spin-driven ferroelectric state in this compound.

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