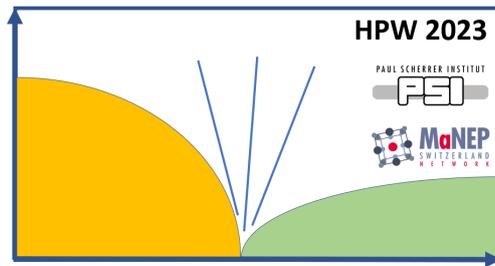


High Pressure Workshop



Contribution ID: 5

Type: **Talk**

Giant pressure-enhancement of multiferroicity in CuBr_2

Wednesday, 22 November 2023 13:45 (15 minutes)

Type-II multiferroic materials, in which ferroelectric polarization is induced by inversion-nonsymmetric magnetic order, promise new and highly efficient multifunctional applications based on the mutual control of magnetic and electric properties. Although this phenomenon has to date been limited to low temperatures, we have found a giant pressure-dependence of the multiferroic critical temperature in CuBr_2 , specifically from 73.5 K at ambient pressure to 162 K at 4.5 GPa. Not only is this to our knowledge the highest value yet reported for a nonoxide type-II multiferroic but its growth also shows no sign of saturating, and the dielectric loss remains small, at these pressures. We establish the structure under pressure and demonstrate a 60% increase in the two-magnon Raman energy scale up to 3.6 GPa. First-principles structural and magnetic energy calculations provide a quantitative explanation in terms of dramatically pressure-enhanced interactions between CuBr_2 chains. These large, pressure-tuned magnetic interactions motivate structural control in cuprous halides as a route to applied high-temperature multiferroicity.

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