Title:	Room-temperature spin-spiral multiferroicity in high-pressure cupric oxide
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Abstract:	Multiferroic materials, in which ferroelectric and magnetic ordering coexist, are of fundamental interest for the development of multi-state memory devices that allow for electrical writing and non-destructive magnetic readout operation. The great challenge is to create multiferroic materials that operate at room temperature and have a large ferroelectric polarization P. Cupric oxide, CuO, is promising because it exhibits a significant polarization, that is, P~0.1 μC cm−2, for a spin-spiral multiferroic. Unfortunately, CuO is only ferroelectric in a temperature range of 20 K, from 210 to 230 K. Here, by using a combination of density functional theory and Monte Carlo calculations, we establish that pressure-driven phase competition induces a giant stabilization of the multiferroic phase of CuO, which at 20–40 GPa becomes stable in a domain larger than 300 K, from 0 to T>300 K. Thus, under high pressure, CuO is predicted to be a room-temperature multiferroic with large polarization.
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