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Micromechanical force detectors for measuring magnetization at high magnetic fields and the magnetic response of Ba₃Cr₂O₈. K. NIN-
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COLLABORATION — We report magnetization measurements of Ba₃Cr₂O₈ using
micromechanical faraday balance magnetometers. The magnetometers consist of a
movable polysilicon plate (500 by 500 micrometers) supported by four springs 2.75
micrometers above a fixed electrode. When small samples of the magnetic material
are placed at the center of the movable plate, the natural gradient of the field creates
a force on the sample that changes the capacitance between the plate and electrode,
while the response to magnetic torque is minimized. The absolute magnetization of
the sample can be determined provided that the magnetic field gradient is known.
The device is used to measure the magnetization of a small sample of Ba₃Cr₂O₈
with mass of 1 microgram. At high fields, our measurements reveal an asymmet-
ric dome like structure in the temperature-magnetic field phase diagram, possibly
related to the Bose-Einstein condensation of spin triplet degrees of freedom.

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