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Biskyrmion bubble lattice in Fe/Gd alloy thin films JAMES LEE, Lawrence Berkeley National Laboratory and University of Oregon, Eugene, XIAOWEN SHI, JORDAN CHESS, University of Oregon, Eugene, SERGIO MONTOYA, Center for Magnetic Recording Research, University of California, San Diego, SHRAWAN MISHRA, Lawrence Berkeley National Laboratory, LEV SAKHAROV, University of Oregon, Eugene, DANIEL PARKS, Lawrence Berkeley National Laboratory, BEN MCMORRAN, University of Oregon, Eugene, STEVEN KEVAN, Lawrence Berkeley National Laboratory and University of Oregon, Eugene, ERIC FULLERTON, Center for Magnetic Recording Research, University of California, San Diego, SUJOY ROY, Lawrence Berkeley National Laboratory — Magnetic bubbles with topologically non-trivial twists, called "skyrmion bubbles," exhibit particle-like properties and novel magnetic interactions with each other. They are seen in non-centrosymmetric crystals, such as MnSi, and monolayers of Fe on Ir(111) substrates. Our study considers whether skyrmion bubbles can also form in soft ferrimagnetic alloys with perpendicular anisotropy. Using resonant x-ray scattering at the Fe L_3 and Gd M_5 transition edges, we show that triangular lattices of skyrmion bubbles form in Fe/Gd thin films in a limited temperature and magnetic field range. Uniaxial anisotropy in the resonant scattering pattern indicates the lattice unit cell contains two skyrmions. Lorentz TEM images reveal that the repeating unit is a bound pair of bubbles called *biskyrmions*. Adjusting the composition of the films can shift the temperature range of the biskyrmion lattice by 100 K, allowing the lattice to form at room temperature. Fe/Gd thin films may prove a promising material for spintronics.

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