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**Evidence from scanning tunneling spectroscopy for magnetic-field-enhanced collective modes in the high-$T_C$ superconductor $YBa_2Cu_3O_{7-\delta}$**[1] A.D. BEYER[2], M.S. GRINOLDS[3], M.L. TEAGUE, N.-C. YEH, Phys. Dept., Caltech, Pasadena, CA 91125, S. TAJIMA, Phys. Dept., Osaka Univ., Japan. — We present scanning tunneling spectroscopic evidence for field-enhanced collective modes in $YBa_2Cu_3O_{7-\delta}$. The observed spectra inside vortices exhibit two characteristic features: a pseudogap ($V_{CO}$= 31.5$\pm$2.0 meV) larger than the superconducting gap ($\Delta_{SC}$= 20.0$\pm$1.0 meV) and a subgap ($\Delta$' $\approx$ 7-10meV) smaller than $\Delta_{SC}$. Outside vortices, the spectra display a gap of $\Delta_{SC}$. As magnetic field increases, spectral weight rapidly shifts from $\Delta_{SC}$to $V_{CO}$ and $\Delta$'. The vortex state also reveals energy-independent conductance modulations with peridocities of 3.6 and 7.1 lattice constants along the Cu-O bonding direction and 9.5 lattice constants along the nodal direction. The energy-independent modulations differ fundamentally from energy-dispersive modes due to Bogoliubov quasiparticle scattering interferences and originate from field-enhanced collective modes of pair-, charge- and spin-density waves.

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