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Magnetoplasmons in quasi-neutral epitaxial graphene nanoribbons JEAN-MARIE POUMIROL, National High Magnetic Field Laboratory, WENLONG YU, CLAIRE BERGER, WALTER DE HEER, School of Physics, Georgia Institute of Technology, MICHAEL SMITH, TAISUKE OHTA, WEI PAN, Sandia National Laboratories, DMITRY SMIRNOV, National High Magnetic Field Laboratory, ZHIGANG JIANG, School of Physics, Georgia Institute of Technology — We report on infrared transmission spectroscopy study of magnetoplasmons in quasi-neutral epitaxial graphene nanoribbon arrays. The energy of the $L_{0(-1)} \rightarrow L_{1(0)}$ inter-Landau level transitions deviates from the characteristic $\sqrt{B}$ dependence observed in two-dimensional graphene. This behavior is explained as a signature of the upper hybrid mode formed between the Landau level transition and the plasmon resonance. Studying the hybrid mode allows us to probe the zero magnetic field plasmon resonance in the interacting regime, when coupling to electron-holes excitations results in strong decay of plasmons. We observe a deviation of the plasmon frequency from the standard $\omega_{pl} \propto q^{1/2}$ dispersion relation, and attribute it to the finite length of the graphene ribbons.

Jean-Marie Poumirol
National High Magnetic Field Laboratory

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