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Critical Role of Modal Spatial Overlap in Nanoscale Nonlinear Optics JIMIN ZHAO, RUI WANG, BEN-LI WANG, R.J. LIU, X.H. LU, ZHI-YUAN LI, Institute of Physics, Chinese Academy of Sciences — We unambiguously demonstrate the critical role of modal spatial overlap in *nonlinear* optics for nanoscale structures. Our experimental and theoretical investigations show that, within a sub-wavelength metallic hole, spatial overlap between the linear and nonlinear modes strongly correlates to the conversion efficiency. Our results provide an accurate explanation for the long-emphasized but elusive shape effect. Moreover, our investigation stimulates new angles for and deeper insights into general nonlinear optics at nanoscale.

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