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Narrowband Nanomechanical Mass Spectrometry using Nonlinear Response of a Graphene Membrane JUAN ATALAYA, ANDREAS ISACSSON, JARI KINARET, Chalmers University of Technology — We propose a scheme for single-particle mass spectrometry using nonlinear response in 2D nanoresonators with degenerate eigenmodes. Using numerical and analytical calculations, we demonstrate that by driving a square graphene nanoresonator into the nonlinear regime, simultaneous determination of the mass and position of an added particle is possible. Moreover, in this scheme only measurements in a narrow band centered at the fundamental mode resonance frequency are needed. This avoids the need for measurements at different frequencies and makes feasible the realization of on-chip single-particle mass spectrometry.

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