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Substrate engineered graphene resonators. RAJAN SINGH, Department of Physics, Indian Institute of Technology - Kanpur, UP-208016, India, RYAN NICHOLL, Department of Physics and Astronomy, Vanderbilt University, Nashville, Tennessee 37235, USA, KIRILL BOLOTIN, Vanderbilt University, Nashville, Tennessee 37235, USA,Freie Universitat Berlin, Arnimallee 14, Berlin 14195, Germany, SAIKAT GHOSH, Department of Physics, Indian Institute of Technology - Kanpur, UP-208016, India — With large Young's modulus, broad frequency tunability, high sample quality and ultra-low mass[1] , free- hanging, single layer graphene resonators have emerged as an attractive candidate for anno and opto-mechnical studies[2]. However, the quality-factor (Q) of graphene resonators have been absymally low. Here we demonstrate the role of discrete substrate modes on the shape of graphene resonance and in particular, the quality factors. We furthermore present an alternative route to excite such resonators, through coherently driven high Q substrate mode. Such hybrid substrate modes, with low graphene mass but high substarte Q can be applied in ultra-high resolution mass sensors[3] at room temperature. References: [1]J.S.Bunch et al., Science 315, 490 (2007). [2]K.S.Novoselov et al., Science 306, 666 (2004). [3]J.Chaste et al., Nature Nanotechnology 7, 301 (2012).

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