Narrow Energy Distributions of Electrons Emitted From Clean Graphene
Field Emission of Clean Graphene

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I will present a recent study [1] on the properties of electrons extracted in vacuum through field emission from a single graphene sheet (Figure 1). Although some work has been done on the topic [2-5], none of them combines sample characterization, ultra-high vacuum condition and Total Energy Distribution (TED) measurements. The full width at half maximum (FWHM) of the energy spread peak is found to be extremely narrow (Figure 2 a-c). Mechanical vibration experiments were also performed and room-temperature Q-factors exceeding 5000 were measured (Figure 2d)[6]. As the Q factor of mechanical resonators strongly increases when going to cryogenic temperatures, such samples could be interesting candidates for mechanical quantum bits if strongly enough coupled with non-linear systems in order to create mechanical anharmonicity [7].

References

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Figures

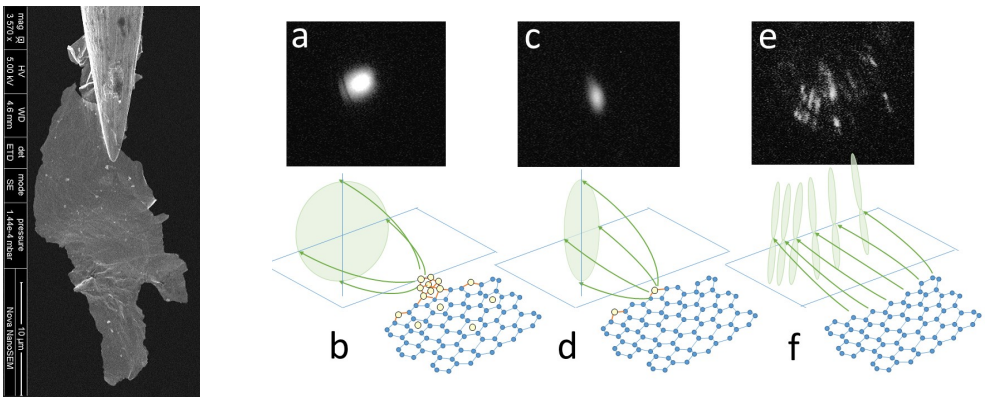

Figure 1: Left, Single layer graphene sample prepared for field emission. Right, field-emission pattern evolution during in-situ cleaning procedure.

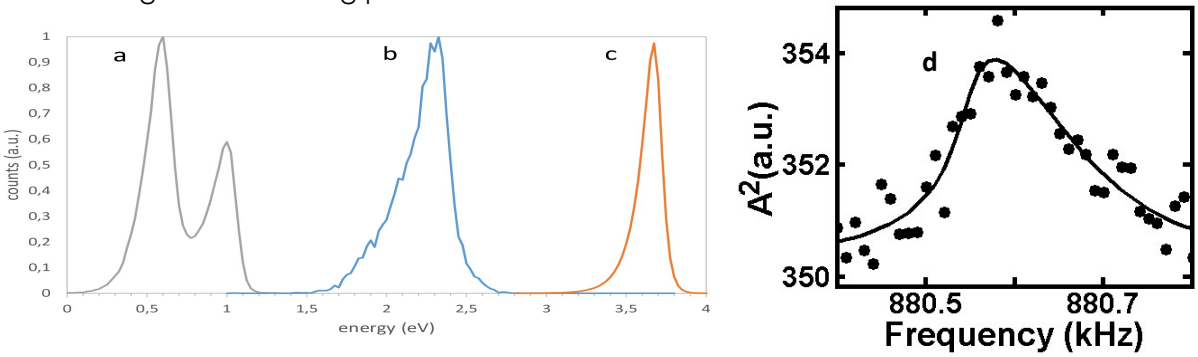

Figure 2: Total Energy Distribution of electron emitted from graphene, respectively (a) dirty, (b) after thermal cleaning and (c) after field desorption. (d) Mechanical response giving a Q-factor of 5400.