Inventory of experimental and theoretical resources available for NanoSpace COST Action	
Country:	FRANCE
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Short description **(max 0.5 page)** of available techniques (experiment or theory): If appropriate, please include 1 picture/figure and caption highlighting resources.	Three devices are available. Two concern mass spectroscopy coupled to optical spectroscopy (ion trap and molecular beam) to study molecules in different forms, and one (called device 3) is a multiwavelength Raman microscope to study material structure. **Device 1:** A cryogenic ion trap for vibrationally-resolved electronic (UV-visible) action spectroscopy of charged aromatic species (protonated, deprotonated, radical cation) of approx < 300 amu. 1 and 2 colour spectroscopies available. **Device 2:** A molecular beam for vibrationally-resolved electronic (UV-visible) multi photon ionisation spectroscopy of neutral aromatic species (molecular and hydrogenated radical) of approx < 300 amu. 1 and 2 colour spectroscopies available. **Device 3:** The Raman microscope is equipped with lasers from 325 to 785 nm. Mapping mode available (lateral resolution: 1 micrometer). There is possibility to do insitu measurements using cells (neutral atmosphere) from 77K to more than 1000K.
Sample/target description (e.g. gas, clusters, solid,…):	For **device 1**: ESI *or* discharge ion source. Liquid samples *or* solid samples soluble in standard ESI solvents/ volatile at < 150 C (oven on pulsed valve/discharge source). For **device 2**: Liquid samples or volatile at < 150 C (oven on pulsed valve/discharge source). For **device 3**: solid. No strict constrain about size, except if environmental cell is used (in that case: d< 7mm)
How to access to experimental/computational resources (e.g. through collaboration, user facility proposal calls,….):	**For device 1 and 2**: Through collaboration. For **device 3**: two modes are possible. Through collaboration (preferred) or by service.
References **(max 5)**:	Related to **device 1**:

	1. Marceca, E.; **Noble, J. A.**; Dedonder-Lardeux, C.; Jouvet, C. (2021) *Loss of CO2 from monodeprotonated phthalic acid upon photodissociation and dissociative electron detachment*, **Journal of Physical Chemistry A**, 125, 7406. doi: 10.1021/acs.jpca.1c04854 2. Jacovella, U.; **Noble, J. A.**; Guliani, A.; Hansen, C. S.; Trevitt, A. J.; Mouzay, J.; Couturier-Tamburelli, I.; Pietri, N.; Nahon, L. (2022) *Ultraviolet and vacuum ultraviolet photo-processing of protonated benzonitrile (C6H5CNH+) An efficient pathway to larger interstellar aromatics?* **Astronomy & Astrophysics**, 657, A85. doi: 10.1051/0004-6361/202142206 Related to **device 2**: 3. Huang, X.; Abrate, J.P.A.; Ehrmaier, J.; **Noble, J. A.**; Xie, W.; Sobolewski, A.L.L.; Dedonder-Lardeux, C.; Jouvet, C.; Domke, W. (2020) *Photoinduced water oxidation in pyrimidine-water clusters: A combined experimental and theoretical study* **Physical Chemistry Chemical Physics**, 22, 12502. doi:10.1039/D0CP01562H Related to **device 3**: 1. A. Merlen, J. G. Buijnsters and **C. Pardanaud** (**2017**) *A Guide to and Review of the Use of Multiwavelength Raman Spectroscopy for Characterizing Defective Aromatic Carbon Solids: from Graphene to Amorphous Carbons.* **Coatings** *7*, 153 2. D. Nikolaievskyi, M. Torregrosa, A. Merlen, S. Clair, O. Chuzel, J. L. Parrain, T. Neisus, A. Campos, M. Cabie, C. Martin, **C. Pardanaud** (**2023**) *Wrinkling and crumpling in twisted few and multilayer CVD graphene: High density of edge modes influencing Raman spectra.* **Carbon** 203, 650

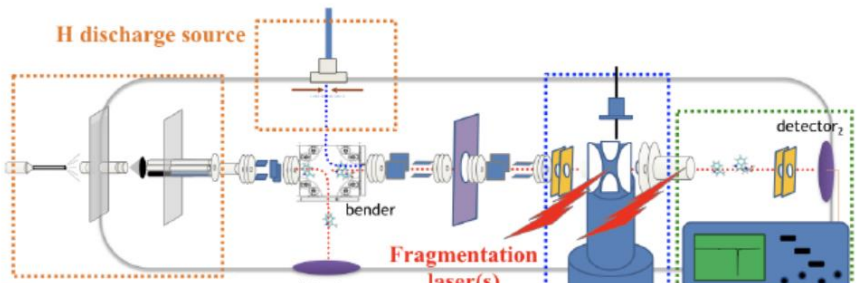


Figure 1: *Ion trap (device 1)*

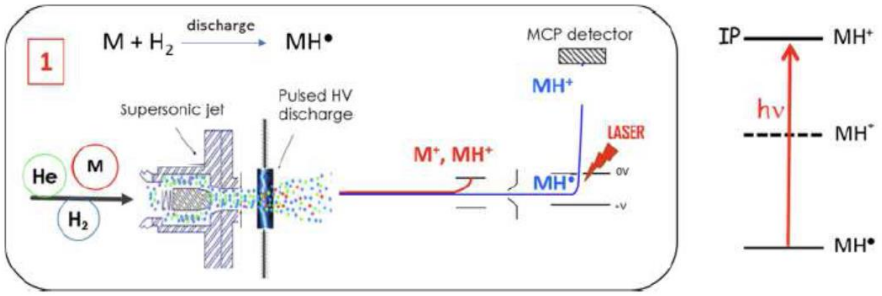


Figure 2: *molecular beam (device 2)*

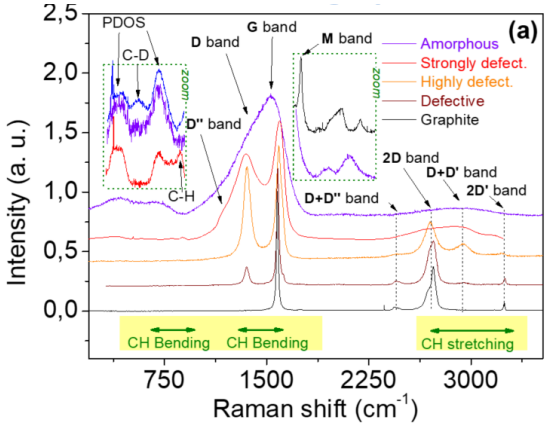


Figure 3. *Raman spectra of a large variety of carbon materials.*