



Contribution ID: 32

Type: **not specified**

Setup and characterization of a confocal Raman imaging microscope built for the measurement of tritiated samples

Wednesday, May 24, 2023 2:00 PM (1 hour)

In recent years, there has been a growing interest in conducting in-situ Raman measurements on tritium-loaded graphene or graphene-like samples due to proposals in neutrino physics programs like KATRIN and PTOLEMY. A confocal Raman microscope (CRM), which can be used for spatio-chemical analysis of these samples, could become radioactive contaminated due to post-loading desorption of tritiated species. Therefore, a suitable CRM has to (i) comply with tritium-safety regulations, (ii) should have a minimal number of parts exposed to contamination, and (iii) can allow for future integration into a tritium glovebox system.

In this work, the setup and the design of a self-built CRM are presented, as well as selected characterization and Raman imaging measurements. Additionally, the status of a graphene-loading chamber with in-situ resistivity and temperature measurements is shown.

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Session Classification: Poster session

Track Classification: Poster presentations