



## AVVISO DI SEMINARIO

### "Dottorato di Ricerca in Fisica e Astronomia"

Il giorno 8 novembre 2018 ore 16.00, aula U1-02

il Dr. **Adrian Hillier**  
STFC Rutherford Appleton Laboratory (UK)  
Muon Group Leader,

nell'ambito della collaborazione all'esperimento INFN di Gruppo V  
CHNET\_TANDEM terrà un seminario dal titolo:

### **Muon Spectroscopy: Probing beneath the surface without a scratch**

*Elemental analysis commonly uses X-ray and electron beams, which are excellent tools for measuring surfaces, however it is often desirable to determine the composition beneath the surface in a non-destructive manner. Implanting negative muons results in X-ray emission that is element dependent and therefore the energy and intensity of such peaks can result in the determination of the elemental composition. These X-rays can have large energies (0.01-6 MeV), because of the mass of the muon, and therefore probing beneath the surface is entirely possible, making this a novel and potentially powerful non-destructive probe. The sensitivity of this technique is such that even light atoms can be detected, such as Li. Furthermore, this technique can be used as a depth analysis tool, since by varying the momentum of the muons it is possible to change the depth of implantation. This can be  $\sim 100 \mu\text{m}$  to over a centimetre in iron, silver and gold or over 4 cm in less dense materials such as carbon. In this seminar, I will present an overview of the technique, along with recent results ranging from cultural heritage to energy materials, thus showing the versatility of the technique and potential applications.*

Colleghi, studenti e tutti gli interessati sono invitati a partecipare.

Per informazioni rivolgersi a

Prof. Giuseppe Gorini: [giuseppe.gorini@unimib.it](mailto:giuseppe.gorini@unimib.it)

Dr. Massimiliano Clemenza: [massimiliano.clemenza@mib.infn.it](mailto:massimiliano.clemenza@mib.infn.it)