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A cura di B. Alzani, M. Bellacosa e G. Bianchi Bazzi
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Aula E - Rosalind Franklin **ore 09:00 – 13:00**

Sezione V
Biofisica e fisica medica

Presiedono: Chiesa C. (Istituto Nazionale dei Tumori, Milano)
Zito M. (Policlinico di Milano)

Relazioni su invito

▲ **Magnetic nanostructures for therapy and diagnostics in biomedicine.**
Mariani M.
Università degli Studi di Pavia, INFN e INSTM, Pavia
Starting from the new millennium the interest for the study of superparamagnetic nanoparticles (NPs) has progressively increased with the ability in manipulating matter at the nanoscale. This has paved the way to the creation of a plethora of novel systems characterized by extremely appealing properties exploitable in a wide number of clinical theranostic applications: the most prominent are Magnetic Resonance Imaging (MRI) and Magnetic Fluid Hyperthermia (MFH). Superparamagnetic nanoparticles are nanometric objects composed by a magnetic core (usually based on magnetite or maghemite) covered with an organic coating. In this framework, we investigated the NPs properties for their application as contrast agents for MRI (diagnostics) and heating agents for MFH (therapy). In particular we focused on their magnetic, relaxometric and hyperthermic properties, in order to improve their efficiency. We verified these features as a function of the kind and size of magnetic core ion, of the shape of the NPs and of the kind of coating.

Comunicazioni

● **Cross-section of the production of theranostic-relevant terbium isotopes by deuterons beam irradiation of dysprosium targets.**
Colucci M. ([1])([2]), Carminati S. ([1])([2]), Manenti S. ([1])([2]), Haddad F. ([3]), Groppi F. ([1])([2])
([1]) *Department of Physics, University of Milan, Milano, Italy*
([2]) *INFN, Section of Milano, Milano, Italy*
([3]) *GIP ARRONAX, Saint-Herblain, Nantes, France*
Recently, lot of interest has arisen in studying the production of four terbium radioisotopes that could be employed for therapy and diagnostic in nuclear medicine. ^{149}Tb can be used for both alpha targeted radiotherapy and PET imaging due to its double decay modality, ^{152}Tb and ^{155}Tb have suitable characteristics for SPECT and PET imaging techniques respectively, while ^{161}Tb, whose decay comes with an intense Auger electrons emission, may found medical application in the Auger Targeted Radiation Therapy. Several production routes have been proposed. We investigated the possibility to produce high specific activity terbium radioisotopes via the $^{nat}\mathrm{Dy}(d,x)^{1xx}\mathrm{Tb}$ reactions, by determining the cross-section and the thin target yield in an energy range between 15 and 32 MeV for the incident deuterons beam. Targets have been irradiated with the ARRONAX cyclotron (Saint-Herblain, Nantes, France) using the stacked foil technique. The determination of the produced activity using high-resolution gamma-ray spectrometry was performed at LASA laboratory (Segrate, Milano). In this contribution we present the preliminary results of this work and the future perspectives.