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## **BAMS: a new compact $^{14}\text{C}$ AMS system at CEDAD (Centre of Applied Physics, Dating and Diagnostics), University of Salento for biomedical and pharmaceutical research**

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In the frame of the PRP (Pathogen Readiness Platform) project funded through the post-pandemic Italian plan for recovery and resilience (PNRR: Piano Nazionale Ripresa e Resilienza) the installation of a new compact Accelerator Mass Spectrometry system is planned at CEDAD (Centre of Applied Physics, Dating and Diagnostics), Department of Mathematics and Physics “Ennio de Giorgi”, University of Salento. The new system is expected to provide an essential asset for drug-development by Biomedical Accelerator Mass Spectrometry (BAMS) which will be adopted as a powerful bio-analytical method for human studies in the areas of pharmacology and toxicology. The new system will assist classic DMPK (Drug Metabolism and Pharmacokinetics) studies where  $^{14}\text{C}$  is used as a tracer in drug development for evaluating the distribution and binding of novel drug candidates allowing the use of low-level drug doses. Microdosing and microtracing will result in a more cost and time effective drug development pipeline. For this application the main requested features for the AMS system are:  $^{14}\text{C}$  sensitivity at least in the 10-15 range ( $^{14}\text{C}/^{12}\text{C}$  ratio), uncertainty better than 0.3% and 0.5 % for solid and gas samples, respectively and high sample throughput.

The new set-up will be formed by a new dedicated  $^{14}\text{C}$  AMS system manufactured by High Voltage Engineering Europa Mod. HVEE 4102Bo operated at a terminal voltage of 210 kV. The system is based on a multicathode S-110C hybrid ion source capable of accepting both solid and gas samples handled by a dedicated gas interface. The tandem accelerator is operated by a vacuum insulated power supply, incorporated into the vacuum vessel and operating at a maximum terminal voltage of 210 kV. The system is equipped with permanent magnets ensuring reduced power consumption (2.5 kW) and is equipped with a dedicated system for automatic tuning and data analysis. The reduced footprint of the machine (approximately 3 x 2.8 m) will allow its installation in the hall where the Tandetron accelerator (HVEE Mod. 4130HC) is installed and in operation.

The general features of the system are presented as well as preliminary results obtained during preliminary tests and future projects.

### **Student Submission**

No

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