

# Monitoring of PET Cyclotron Radiation Fields Using a Novel Bonner Sphere Spectrometer

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**Abstract.** The paper presents results of monitoring radiation fields in the vicinity of an 18 MeV proton PET cyclotron CYCLONE18/9 used in a PET-center for production of PET isotopes. The radiation fields were monitored from the point of view of prompt radiation, i.e. during the cyclotron operation as well as from the point of view of activation of selected cyclotron components. Differences regarding the prompt radiation fields have been observed for two regimes of the cyclotron operation corresponding to the production of two different PET isotopes, namely  $^{18}\text{F}$  and  $^{11}\text{C}$ . Special attention is paid to neutron spectra measurements. For this purpose, a novel indium-based Bonner Sphere Spectrometer (BSS) has been developed, tested and applied successfully for characterizing the neutron fields generated during the cyclotron operation.