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The design of neutron imaging instrument combined with PGGA set up at Maamora Triga Reactor

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A new neutron imaging instrument will be built to support the area of neutron imaging research (neutron radiography and tomography) At Maamora Triga research Reactor (CNESTEN Research Centre, Rabat). The instrument is designed for research community and for routine quality control for industrial, mining, automotive and aircraft applications. It will be also useful tool for assessing water damage in air craft components, and the study of archaeological artefact. This neutron imaging set up will be combined with Prompt gamma with the prompt gamma-ray activation. The whole system will be mounted on the tangential channel. Both techniques are complementary and their combination provides full picture about sample by obtaining the material's composition and the spatial distribution of the material in the sample set up. In this configuration the convergent part consist on the association of material with capability to reduce rapid neutrons and gamma (Borate Iron, Borate polyethylene and lead), and a primary shutter. The installation of these parts is in process. The second part is housed in the Triga Reactor hall, and including: The drum exchanger Collimator, Flight tube and Beam delimiter. As defined in our previous works basing on Geant4 simulations, fast neutron (5cm sapphire) and gamma (5cm bismuth) filters will be inserted in the convergent part.

The L/D drum exchanging is housing 4 pinhole collimator with apertures of 1cm, 2cm, and 2,5cm and will reduce the beam size to 8 cm x 8 cm, 12 cm x 12 cm and 20 cm x 20 cm at the detector position respectively. The whole instrument will operated in three different positions, one for high resolution and the other for high speed.

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