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Status of the Jordanian research and training reactor (JRTR)

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The JRTR has been built to be the corner stone of the center for excellence in nuclear sciences and technology. It is a multipurpose, 5 MW_{th} upgradable to 10 MW_{th} research reactor. It uses the well proven LEU fuel plates of U_3Si_2 in Aluminum matrix. The thermal neutron flux in the core center has been measured to $1.7x10^{14}/cm^2s$. The JRTR is equipped with 22 in-core irradiation locations mainly for Neutron Transmutation Doping (NTD), Neutron Activation Analysis (NAA), Radioisotope Production (RI), Research, and Training and Education. Particularly, three facilities for ^{192}Ir, ^{131}I, and ^{99}Mo production using neutron activation will be operational at the startup date. Also On-Power Loading and Unloading (OPLU) of targets shall be possible for ^{192}Ir and ^{99}Mo. Three facilities, low-γ environment, for NAA will be operational. In particular, NAA requires thermal and epithermal spectra; two thermal and one epithermal spots will be available. The NAA Facility is equipped with three Pneumatic Transfer Systems (PTSs). Very soft spectra can be utilized (future plan). Two NTD locations for up to 6-inch ingots and one for up to 8 inches are available. Three other locations for future expansions will be available. For the ex-core irradiation services, there are four tangentional beam ports and a one thermal neutron column facing the core. The beam ports will be used for Neutron Radiography (NR), and two beam ports for Standard Applications (ST). In addition, a future Cold Neutron Source (CNS) is planned to be installed. The initial criticality has been achieved using external neutron source on April 25, 2016, and all planned hot commissioning tests have been carried out successfully.
The planned Neutron Radiography Facility (NRF) at JRTR will be at the level of the state-of-the-art facilities worldwide. It will cover all aspects of standard applications like neutron radiography and tomography. The instrument can accommodate large spectrum of research projects related to cultural heritage, materials science, energy renewable sources, geology, biology and fundamental science. Innovative experimental methods like phase-contrast imaging and real-time radioscopy will be possible. Industrial applications can be performed with a great success at this instrument. The facility will be instrumental for serving the needs of the future neutron and X-ray imaging community in Jordan and in the region.

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