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X-ray and Neutron Radiography/Tomography at Necsa: A success story

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Necsa is privileged and in an unique situation within the South African context to host both neutron and X-ray radiography and tomography facilities on its premises at Pelindaba, 35 km West of Pretoria.
True to the mission of Necsa to engage with stakeholders in the area of radiation sciences, international and national researchers and post graduate students are actively utilizing the imaging facilities through successful User Office beam line applications. Nuclear related areas such as post irradiation examination of nuclear fuel, or the characterization of barriers for nuclear waste within the nuclear fuel cycle, are addressed by this technology. However, the technical expertise of instrument scientists are being development and molded through the utilization of these facilities by researchers and post graduate students from Higher Educational Institutes (HEI's) and research centers, thus contributing to and supporting the National System of Innovation (NSI).
The neutron radiography/tomography facility is currently in an upgrade phase to enhance the versatility of the facility to supply not only a thermal neutron beam but also predominantly fast neutron as well as Gamma-Ray radiation beams. A section of this presentation focusses on the successes and research highlights achieved at the SANRAD facility.
To complement the neutron imaging probe at Necsa, X-ray tomography and micro-focus X-Ray tomography as imaging probes were introduced and implemented in 2007 and 2011 respectively. This facility at Necsa, in concurrence with the µXCT facilities at WITS and SUN, which were established through NRF support in 2011 to address the needs of local researchers in 3D analytical and non-destructive testing research capabilities.. It is generally perceived that the outcome of research conducted at these local µXCT facilities forms the basis of ground work research to be performed before a competitive project proposal can being submitted to a synchrotron facility.
Since the establishment of the µXCT (MIXRAD) facility at Necsa, the available beam time is fully booked as, on average, approximately 35 research projects per annum are being submitted for support. To date, the academic research output comprises of more than 150 publications including post graduate dissertations and thesis's, which spans all scientific fields ranging from palaeosciences to soil, geoscience, civil engineering and biosciences to name a few. This presentation will also highlight the application of µXCT in various research fields to show its versatility but also the important role it plays within the NSI and the South African research community.

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