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Cross Section Measurements for Neutron Induced Reactions on Bi Target using Quasi Mono-Energetic Neutron Beams of 90 and 140 MeV Energies.

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Abstract content
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Cross section measurements for the ²⁰⁹Bi(n,5n)²⁰⁵Bi, ²⁰⁹Bi(n,4n)²⁰⁶Bi and ²⁰⁹Bi(n,3n)²⁰⁷Bi reactions were performed using quasi-monoenergetic neutron beams of 90 and 140 MeV energies. Neutron beams were produced from ⁷Li(p,n)⁷Be reaction using the neutron beam facility of iThemba LABS. Gamma rays emitted by the radioactive samples were measured using High Purity Germanium (HPGe) detector of the Environmental Radioactivity Laboratory (ERL) available at iThemba LABS. The acquired gamma ray spectra were analyzed using Multi Channel Analyzer (MCA), in order to identify the long lived radionuclides produced. The cross section data found from this work was compared with the existing experimental as well as the available evaluated data of the International Reactor Dosimetry Fusion File (IRDFF) library. The comparison shows good agreement between the compared data. The cross section data from this work will be important for testing, improving and extending the IRDFF library since the existing experimental data for high energy neutron is insufficient. To the IRDFF library, the current contribution from iThemba LABS will improve the Bi data for high threshold energy (n,xn) reactions with cross section peaks located at 90 and 140 MeV neutron energies in order to meet the requirements of the higher energy nuclear installations.

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Main supervisor (name and email)
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