

This diploma thesis deals with the validation of spectral average cross-sections (SACS) of $^{55}\text{Mn}(n,2n)^{54}\text{Mn}$, $^{90}\text{Zr}(n,2n)^{89}\text{Zr}$, $^{127}\text{I}(n,2n)^{126}\text{I}$ reactions in well-defined LR-0 reactor spectrum. The measurement of SACS for selected reactions is of high interest because they are used for the practical reactor dosimetry. Various experiments for description of neutron field in reactor and detector characterization, which are necessary for validation, are described. The spectral average cross-sections are derived from Net Peak Areas of irradiated samples measured using a semiconductor high purity germanium detector. Obtained results were compared with MCNP6 calculations using ENDF/B-VII.0, ENDF/B-VII.1, JEFF-3.1, JEFF-3.2, JENDL-3.3, JENDL-4, ROSFOND-2010, CENDL-3.1 and IRDFF nuclear data libraries. Notable discrepancies were found in $^{90}\text{Zr}(n,2n)^{89}\text{Zr}$ and $^{127}\text{I}(n,2n)^{126}\text{I}$ reactions. This thesis also contains a theoretical basis for the interaction of neutrons with matter.