

## OPTIMIZATION AND VERIFICATION OF DOUBLE LAYER BEAM SHAPING ASSEMBLY (DLBSA) FOR EPITHERMAL NEUTRON GENERATION

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| <b>First Author</b> |   |
| <b>Last Author</b>  |   |
| <b>Authors</b>      | Bilalodin; Haryadi, A; Sari, K; Wihantoro;  |
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| <b>Abstract</b>     | <p>The designs of Beam Shaping Assembly (BSA) for moderating fast neutron into epithermal neutron have been conducted. Some BSA models that are previously developed are still having problems in generating epithermal neutron. Instead, we propose designs of double layer beam shaping assembly (DLBSA) to produce epithermal neutron. Optimization of the Double Layer Beam Shaping Assembly (DLBSA) design was carried out using the genetic algorithm (GA) method using MCNPX and verified using the Particle and Heavy Ion Transport code System (PHITS). The optimization resulted in four configurations up to the 21st generation capable of producing epithermal neutron beams that comply with the IAEA standards. The best four configurations are obtained by combining: (1) Al with one of the CaF<sub>2</sub>, BiF<sub>3</sub> or PbF<sub>2</sub> materials as moderator, (2) Pb with Pb, Ni, or Bi as are flector, (3) Ni with FeC, or C as collimator, (4) (FeC + LiF) as fast neutron filter, Cd or B<sub>4</sub>C as thermal neutron filter. Verification of the four optimum configurations of the DLBSA model using PHITS code shows that the epithermal neutron beam produced by DLBSA has met the IAEA standards.</p> |
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| <b>Author</b>       | Dr BILALODIN, S.Si, M.Si  |