Reflective boundaries simulate an infinite source in the z-direction. This caused a more tangential angular distribution of the source neutrons incident on the First Wall. Tangential neutrons cause an overestimation of nuclear heating in the first wall. Simulation accuracy was increased using DAG-MCNPX's surface source feature. The hybrid source overestimated the total number and underestimated the average energy of particles incident on the First Wall. This is because the geometry of the hybrid model creates tangential source particles which result in additional reflection into the chamber. The average energy of particles in the hybrid model is lower, suggesting softer neutron and gamma photon spectra.

Nuclear heating was calculated on cylindrical mesh tallies. Structured mesh tallies then were interpolated onto conformal tetrahedral mesh for CFD. Using VisIt visualization suite from LLNL, nuclear heating data was visualized. The hybrid source was found to overestimate nuclear heating in the first wall by as much as 63%.

CONCLUSIONS
- Simulation accuracy was increased using DAG-MCNPX’s surface source feature.
- The hybrid source overestimated the total number and underestimated the average energy of particles incident on the First Wall.
- The hybrid source was found to overestimate nuclear heating as much as 63% in the First Wall.

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