

List of Potential Projects for 22.106 Term Paper

- Importance of Inelastic Scattering in fast reactors
- Image rendering simulations (shading, blurring, ...)
- Analytical or semi-analytical solutions of the Transport Equation
- Superposition/Convolution techniques for photon transport
- External beam therapy optimization
- Gamma scan for determining isotopic composition in spent nuclear fuel
- Irradiation effects in material
- Small angle neutron scattering
- Electron transport
- Nuclear shield design for a given applications
- Nuclear detection simulation in cargo (active or passive systems)
- Source convergence studies in Monte Carlo criticality calculations
- Dose deposition following nuclear interactions
- Unresolved resonance treatment (probability tables)
- Mo-99 production by neutron activation in a reactor
- Control rod degradation
- Perturbation theory in detection systems
- Fast neutron detector design
- Food sterilization
- Chemical tracers (production, detection, ...)
- Dancoff factors – Bryan Herman
- Cross-sections resonance treatment (sub-group methods, ...)
- Method of Characteristics
- Shannon entropy in Monte Carlo simulations
- Wielandt's method in Monte Carlo criticality calculations
- Spallation physics
- Deterministic importance mapping – Jeremy Roberts
- Quantum Computing – Suransh Galanti

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22.106 Neutron Interactions and Applications
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