

# MOLLER Tasks List (Simulation Subsystem)

Task No.	Subsystem	Task	Description	Comments	Dependency list & time needed to complete (in weeks)	"Owner"
1	Simulation	PMT double-differences	Using Qweak experience, evaluate upper limit to possible systematic from A_T in thin quartz and shower-max	UVa group has agreed to work on this over the next few months	Dep: {4}	Ciprian*, Kent
2	Detectors	Main detector geometries	Optimize the ring radial and azimuthal dimensions to optimize background asymmetry correction determination and systematic	UVa group working on this; Ciprian in process of reproducing Yuxiang's work; then start optimizing		Ciprian*
3	Detectors/ Simulation	Shower-max splashback	Estimate possible background in main detector PMTs from shower-max splashback	SBU undergraduate and graduate students will work on this	Dep: {2}	KK*, student
4	Detectors/ Simulation	PMT backgrounds	A comprehensive estimate of all backgrounds at the main detector PMTs	Manitoba and SBU to improve these estimates; Sakib will work on this	Dep: {2}	Juliette*, Sakib
5	Detectors/ Simulation	Detector Shielding Optimization	Figure out the configuration of heavy-Z and light-Z shielding required in front of and around the PMTs to minimize soft background	SBU will work on this after shielding geometry optimization is complete		KK*, Cameron
6	Detectors/ Simulation	Slit scattering background	A comprehensive note summarizing the elimination of all 1-bounce sources and the leading 2-bounce sources	To be assigned once further progress is made on other background tasks?	Dep: {2,3,4; 5}	KK*, student
7	Detectors/ Simulation	Crosstalk evaluation	Evaluate impact on specific detector measurements of background from other detectors	Main source is lightguide background from primary flux. SBU undergraduate project	Dep: {2,4}	KK*, student

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8	General/ Simulation	Radiative corrections for all physics processes	Incorporate radiative corrections for e-e and inelastic e-p scattering	Seamus and Yury to devise a plan of action		Seamus*, Yury
9	Pion/ Simulation	Muon pair production	Muon pair production in the target might be significant for pion detector asymmetry measurements	Wouter is working on it; use MadGraph5 generator but need to translate generator output for remoll compatibility	{No dependencies}  (3 weeks) -- experienced researcher project	Wouter*
10	Pion/ Simulation	Beam dump background impact	beamdump backgrounds may affect some detectors	Pion group is looking at impact on pion detector	Dep: {Implement hall A geometry based on PREX (Rakitha project— not listed)} (6 weeks) -- undergrad project	Wouter*
11	Simulation/ Pion	Hyperon background estimation	Strategy to evaluate the hyperon background using the full suite of detectors	Pion and simulation groups should coordinate this task and build on Konrad's previous work	Dep: {2, pion wall and shower-max geometry, 5, baseline pion det. design and implement Hyperon generator (new tasks -- not listed)} (12 weeks) -- summer project	Wouter*
12	Simulation/ Tracking	Optics Collimator for Q2	Simulated Q2 analysis and the use of tracking and special collimation	David and Seamus should devise a plan, building on Rupesh's previous work		Seamus*, David