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Simulating J-PET detector on NVidia Ray Tracing Hardware

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Image reconstruction in PET tomography requires a good description of the detector response usually in the form of the system matrix or kernel. This is normally not possible to calculate exactly. One alternative is to use Monte-Carlo methods. However standard simulation software like Geant or GATE is too slow to obtain the system matrix of the detector with good accuracy in a reasonable time. To this end, we have used a custom build software running on NVidia GPU using CUDA. Last year NVidia released a new line of graphics cards (RTX) with hardware support for ray tracing. This seems a perfect tool for simulation of the interaction of particles in the detector. In this talk, I will present the results we have obtained on this new hardware.

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