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Missile defense requires flash radiometry for target kill assessment and spectral analysis of high impact scenarios. The Computed Tomography Imaging Spectrometer (CTIS) is a unique non-scanning sensor capable of simultaneously acquiring full spectral and spatial information that is being considered by the Missile Defense Agency for such applications. Because of the considerable amount of information provided by CTIS, and the requirement for real-time performance, there is a critical need to accelerate the recovery time of the imaged hyperspectral object by orders of magnitude, both by designing new algorithms, and by considering implementation on emerging revolutionary hardware.

The goal of this project is twofold. First, our objective is to design a fast (terminal attractor dynamics based) algorithm for inverse hyperspectral imaging that fully exploits the sparcity and structure of the CTIS optical system matrix. Second, we propose to carry out the implementation of this algorithm on the Sony-Toshiba-IBM (STI) CELL multi-core processor, which is capable of high parallelism that can be translated to very high performance computing.

The results of this project will support ongoing work for the Missile Defense Agency, and will contribute to the mission of the DOE Office of Science in high performance computing.

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