Scalable Eigensolver for Many-Fermion Dynamics - nuclear (MFDn)

ASCR/NP – Applied Math/Computer Science Highlight

**Objective**
- Efficient and scalable iterative solvers for extreme-scale eigenvalue problems arising in nuclear physics (MFDn code)

**Impact**
- Drastically reduced communication overheads
- Significant speed-ups over earlier version of MFDn (up to 6x on 18,000 cores)
- Almost perfect strong scaling on up to 260,000 cores on Jaguar

Flow-chart for multi-threaded SpMV computations during the eigensolve phase of MFDn. Expensive communications are overlapped with computations. Explicit communications are carried out over topology-optimized groups [2].

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