962-65-1182 **James Baglama*** (jbaglama@math.bsu.edu), Mathematical Sciences, Ball State University, Muncie, IN 47306, and **Daniela Calvetti** and **Lothar Reichel**. *Finding a few interior eigenvalues of a large symmetric matrix without factorization.* Preliminary report.

A large number of algorithms for the solution of the symmetric eigenvalue problem are based on the Lanczos process. The Lanczos process is very effective for finding extreme eigenvalues. However, the Lanczos process provides poor or no convergence towards eigenvalues in the interior of the spectrum unless the process is combined with inverse iteration. Inverse iteration requires factorization of the matrix A-zI into triangular matrices, and possibly a diagonal matrix. This computational effort required for the factorization may be prohibitive when the order of A is large. In 1999, we developed the implicitly Restarted Block Lanczos (IRBL) method for the computation of a few extreme multiple or close eigenvalues and associated eigenvectors of a large sparse symmetric matrix. Our method generalizes the Implicitly Restarted Lanczos (IRL) method introduced by Sorensen in 1992 and gives rapid convergence, reliably detects extreme multiple or close eigenvalues, and requires little computer storage in addition to the storage used for the desired eigenvectors. For this talk we will describe a new method that uses the strategies of the IRBL method to find interior eigenvalues without requiring the factorization of matrices of the form A-zI (Received October 02, 2000)