1056-60-1993   **Reid Andersen** and **Yuval Peres*** (`peres@microsoft.com`), 1 Microsoft Way, Redmond, WA 98052. *Finding Sparse Cuts Locally Using Evolving Sets.*

The connection between expansion properties of a graph and mixing time of a random walk on it is well known. "Evolving sets" are a set valued process that explains the connection probabilistically and allows use of size dependent expansion data. This process was analyzed by Morris and Peres (2003), and is related to the strong stationary duality analyzed in 1990 by Diaconis and Fill. We show how this process, first developed for theoretical purposes, yields an effective local partitioning algorithm that can identify a "community" for a given node in time that is proportional to the community size rather than the size of the whole graph. (Received September 22, 2009)