This paper investigates the problem of bearing measurement based distributed localization for sensor networks that are undirected and switching. Each node holds a local coordinate system with no knowledge about the global coordinate system and measures the bearing angle information about its neighbors in its local coordinate system. A novel scheme for localization is developed using a complex Laplacian to overcome the challenges due to the absence of a global coordinate system and the presence of topology switching in communication. First, by using bearing-only measurements, an algorithm is proposed to establish linear equation constraints for the coordinates of sensor nodes in the global coordinate frame. The main idea is that each node uses its own bearing and its neighbors' bearing information to construct a similar configuration, though it is not able to recover the true configuration by using only bearing measurements. Second, a distributed iterative algorithm is proposed such that all the sensor nodes can cooperatively find the true coordinates of themselves. It is shown that the algorithm exponentially converges, provided that the communication network jointly satisfies certain connectivity properties. The simulation results validate our proposed algorithm.