1079-05-290 **Jingfen Lan** and **Linyuan Lu*** (`lu@math.sc.edu`), Columbia, SC 29208. *Diameters of Graphs with Spectral Radius at most* $\frac{3}{2}\sqrt{2}$.

The spectral radius $\rho(G)$ of a graph G is the largest eigenvalue of its adjacency matrix. Woo and Neumaier discovered that a connected graph G with $\rho(G) \leq 3/2\sqrt{2}$ is either a dagger, an open quipu, or a closed quipu. In this paper, we proved the following results. For any open quipu G on n vertices ($n \geq 6$) with spectral radius less than $3/2\sqrt{2}$, its diameter $D(G)$ satisfies $D(G) \geq (2n-4)/3$. This bound is tight. For any closed quipu G on n vertices ($n \geq 13$) with spectral radius less than $3/2\sqrt{2}$, its diameter $D(G)$ satisfies $\frac{n}{3} < D(G) \leq \frac{2n-2}{3}$. The upper bound is tight while the lower bound is asymptotically tight. Let $G_{n,D}^{min}$ be a graph with minimal spectral radius among all connected graphs on n vertices with diameter D. For $n \geq 13$ and $D \in [\frac{n}{2}, \frac{2n-7}{3}]$, we proved that $G_{n,D}^{min}$ is the graph obtained by attaching two paths of length $D - \lfloor \frac{n}{2} \rfloor$ and $D - \lceil \frac{n}{2} \rceil$ to a pair of antipodal vertices of the even cycle $C_{2(n-D)}$. Thus we settled a conjecture of Cioab-van Dam-Koolen-Lee, who previously proved a special case $D = \frac{n+e}{2}$ for $e = 1, 2, 3, 4$. (Received January 17, 2012)