Binary Representations of Regular Graphs

Abstract:

A spherical representation of a graph $\Gamma$ in a metric space $M$ is an injective map from the vertex set of $\Gamma$ to a sphere in $M$; it is assumed that there exist $d_1 < d_2$ such that the distance between the images of any two distinct vertices is equal to $d_1$ if the vertices are adjacent and it is equal to or $d_2$ otherwise.

A particular case of $M = H_n$, the binary Hamming space of $(0,1)$ strings of length $n$, sometimes yields a useful information about the graph $\Gamma$. The least $n$, for which such a representation is possible, is the binary spherical representation number of $\Gamma$, or $bsr(\Gamma)$. I will show that if $\Gamma$ is a connected regular graph, then $bsr(\Gamma) \geq |\Gamma| - m$ where $m$ is the multiplicity of the least eigenvalue of $\Gamma$. The case of equality gives a characterization of an important class of strongly regular graphs that has been avoiding a good characterization for 60+ years.

SNACKS IN FACULTY LOUNGE AT 3:30 PM.
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)