1065-17-225 **Alex J Feingold** and **Jurisich Elizabeth*** (jurisiche@cofc.edu), Department of Mathematics, College of Charleston, Robert Scott Small Building / Room 339, Charleston, SC 29424. *Decomposition of a rank 2 hyperbolic Kac-Moody Lie algebra with respect to the Nicolai-Olive principal $so(1,2)$ subalgebra.* Preliminary report.

Let $H(3)$ be the rank 2 hyperbolic Kac-Moody Lie algebra with Cartan matrix $\begin{bmatrix} 2 & -3 \\ -3 & 2 \end{bmatrix}$. The Nicolai-Olive principal $so(1,2)$ subalgebra S is isomorphic to sl_2. We study the decomposition of $H(3)$ with respect to S, into a direct sum of irreducible S-modules. This decomposition is of the form $S \oplus V(\infty) \oplus \bigoplus_{k=3}^{\infty} m_k(V(k) \oplus V(-k))$ where $V(\infty)$ is infinite-dimensional having one-dimensional weight spaces for each weight $n \in \mathbb{Z}$. The other summands in the decomposition are either highest weight S-modules, $V(-k)$ with highest weight $-k$, or lowest weight S-modules, $V(k)$, with lowest weight k. The multiplicities, m_k, with which these occur, are the dimensions of the spaces of extremal vectors in these modules. We conjecture that the Lie subalgebra of extremal vectors of positive weight is a free subalgebra. (Received September 14, 2010)