In this talk we discuss a necessary and sufficient condition for a family of sums of squares operators to be globally hypoelliptic on a torus. Let \( P \) be given by

\[
P = -\partial_{t_1}^2 - (\partial_{t_2} + a(t_1, t_2)\partial_x)^2,
\]

where \((t_1, t_2, x) \in \mathbb{T}^3\) and \(a \in C^\infty(\mathbb{T}^2)\) is real valued. This condition says that either a Diophantine condition is satisfied or there exists a point of finite type. Also, we describe the analytic and Gevrey versions of this result. The proof is based on \(L^2\)-estimates and microlocal analysis. (Received January 28, 2008)