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A. A. Himonas (himonas.1@nd.edu), Department of Mathematics, University of Notre Dame, Notre Dame, IN 46556, **G. Petronilho*** (gerson@dm.ufscar.br), Universidade Federal de São Carlos, Departamento de Matemática, Rodovia Washington Luiz, Km. 235, 13565-905 São Carlos, Sao Paulo, Brazil, and **L. A. dos Santos** (luis@dm.ufscar.br), Universidade Federal de São Carlos, Departamento de Matemática, Rodovia Washington Luiz, km. 235, 13565-905 São Carlos, Sao Paulo, Brazil. *Regularity of a class of sublaplacians.*

Given m real vector fields $X = \{X_1, \cdots, X_m\}$ on a C^∞ manifold $\mathcal{M}$, their sublaplacian is defined by $\Delta_X \doteq -(X_1^2 + \cdots + X_m^2)$. In general this is a degenerate elliptic operator. By the famous Hörmander's theorem it is locally, and therefore, globally hypoelliptic if all points of $\mathcal{M}$ are of finite type. In this work we shall focus on global hypoellipticity when the manifold is a torus $\mathbb{T}^N$. The main motivation comes from the following result that has been proved by Himonas: the operator $-[\partial_{t_1}^2 + (\partial_{t_2} + a(t_1)\partial_x)^2]$ is globally hypoelliptic in $\mathbb{T}^3$ if and only if the range of $a(t_1)$ contains an irrational non-Liouville number. Our main theorem here extends this result in the case that the coefficient a depends on both variables t_1 and t_2. (Received January 08, 2006)