1145-49-2889 **Ugur Abdulla**, 150 W. University Blvd, Mathematical Sciences Department, Melbourne, FL 32901, and **Jonathan Goldfarb***, 150 W. University Blvd, Mathematical Sciences Department, Melbourne, FL 32901. *Optimal Control of One-Phase Free Boundary Problems in Multiple Space Dimensions.*

We consider an inverse one-phase Stefan-type free boundary problem (ISP) for the second order parabolic PDE

$$\Delta u + a \cdot \nabla u + a_0 u - \frac{\partial u}{\partial t} = f \text{ in } \Omega = D_1 \times (0,T) \cup \{(x,t) : \ x \in D, \ \eta(x) < t < T, \}$$

A new variational formulation developed in *U. G. Abdulla, Inverse Problems and Imaging, 7, 2(2013), 307–340; 10, 4 (2016), 869-898* is extended to many space variables. We pursue optimal control framework in Besov spaces framework, where free boundary and the density of the sources are control vector components and the cost functional consists of the L_2-norm declination of the traces of the temperature at the final moment and free boundary from available measurements. The existence of the optimal control is proved and the convergence of the sequence of the discrete optimal control problems to continuous optimal control problem is analyzed. (Received September 25, 2018)