1047-42-199 **Loukas Grafakos*** (loukas@math.missouri.edu), Department of Mathematics, University of Missouri, Columbia, MO 65211, and **Christopher Sansing**. *Gabor frames and directional time–frequency analysis.*

We introduce a directionally sensitive time–frequency decomposition and representation of functions. The coefficients of this representation allow us to measure the "amount" of frequency a function (signal, image) contains in a certain time interval, and also in a certain direction. This has been previously achieved using a version of wavelets called ridgelets [E.J. Candes, Harmonic analysis of neural networks, Appl. Comput. Harmon. Anal. 6 (1999) 197–218; E.J. Candes, D.L. Donoho, New tight frames of curvelets and optimal representations of objects with piesewise-C2 singularities, Comm. Pure Appl. Math. 57 (2004) 219–266] but in this work we discuss an approach based on time–frequency or Gabor elements. For such elements, a Parseval formula and a continuous frame-type representation together with boundedness properties of a semi-discrete frame operator are obtained. Spaces of functions tailored to measure quantitative properties of the time–frequency–direction analysis coefficients are introduced and some of their basic properties are discussed. Applications to image processing and medical imaging are presented. (Received January 28, 2009)