5005-C1-17 **Stefan Kunis*** (kunis@mathematik.tu-chemnitz.de), Chemnitz University of Technology, Germany, and **Holger Rauhut** (holger.rauhut@univie.ac.at), University of Vienna, Austria.
The nonequispaced FFT and its application in sparse Fourier analysis.

We study sparse trigonometric polynomials

$$f(x) = \sum_{k \in I_N} \hat{f}_k \mathrm{e}^{-2\pi \mathrm{i} k x}, \qquad I_N := \{-\frac{N}{2}, \dots, \frac{N}{2} - 1\},$$

with non-zero complex Fourier coefficients $\hat{f}_k$ only on a set $T \subset I_N$ with size $|T| \ll N$. However, a priori nothing is known about T apart from a maximum size. Our aim is to sample f at M randomly chosen nodes $x_j \in [-\frac{1}{2}, \frac{1}{2}]$ and try to reconstruct f from these samples.

For an appropriate number of samples M, greedy methods like (Orthogonal) Matching Pursuit or Thresholding succeed in this task with high probability. We focus on the computational complexity of the proposed methods when using the nonequispaced FFT and particular updating techniques. Illustration of our observations is given by numerical experiments. (Received April 19, 2007)