1037-44-77 **Mikhail Kapralov** and **Alexander Katsevich*** (akatsevi@pegasus.cc.ucf.edu). *On the study of 1PI algorithms for a general class of curves.*

We extend an efficient cone beam transform inversion formula, developed earlier by the authors for smooth curves with positive torsion, to a more general class of helix-like curves. These curves are allowed to have negative torsion, and they can be non-smooth at isolated points. The notions of turns and PI segments are extended. The new class is defined by several geometric conditions which impose a tradeoff between the length of critical PI lines (which reflect how severely the positivity of torsion is violated) and the extent to which the curve bends between neighboring turns. The main property of curves from this class is that critical PI lines are allowed to be arbitrarily close to the set U where reconstruction is possible, but are not allowed to intersect it. Some of the conditions that define the class turn out to be common for many known trajectories, so we investigate separately the properties of the Crofton symbol of PI segments of curves that satisfy these conditions. The results of the investigation are then used to develop an efficient filtered backprojection algorithm. Numerical experiments conducted with a clock phantom demonstrate good image quality. (Received January 23, 2008)