

**RECENT RESULTS ON LEVI-FLATS BY SOLVING  
THE CAUCHY-RIEMANN EQUATIONS WITH  $L^2$   
ESTIMATES**

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ABSTRACT. Let  $D$  be a smoothly bounded locally pseudoconvex domain in a complex manifold. In recent years it turned out that the method of  $L^2$  estimates is still useful even if the Levi form of the boundary of  $D$  is totally degenerate. As a result, a nonexistence theorem for the Levi flat hypersurfaces in complex projective spaces of dimensions  $> 2$  has been established by Y.-T. Siu. By developing the method of Siu, the structure of Levi flat hypersurfaces in complex tori has been investigated in my recent works, which will be reported in the talk.