



**THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY**

**Department of Mathematics**

**SEMINAR ON PDE**

**Non-classical solutions to the  $p$ -Laplace equation**

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**Abstract**

In this talk we will consider the  $p$ -Laplace equation

$$\operatorname{div}(|Du|^{p-2}Du) = 0.$$

We will focus on the very weak solutions, i.e. solutions  $u$  to the  $p$ -Laplace equation with  $u \in W^{1,q}$ , where  $\max(1, p - 1) < q < p$ .

In 1994, T. Iwaniec and C. Sbordone showed that if  $q$  is sufficiently close to  $p$ , then very weak solutions belong to  $W^{1,p}$ , and thus are classical solutions. They conjectured the same to happen for any  $\max(1, p - 1) < q$ . In this talk, I will present a positive result which shows that Iwaniec-Sbordone's conjecture is true if the gradient of  $u$  belongs to suitable cones, and next I will sketch the construction of a counterexample for this conjecture if this additional condition is not fulfilled. This is based on a joint work with Maria Colombo.

**Date: 26 September 2024 (Thursday)**

**Time: 4:00pm**

**Zoom Meeting: <https://hkust.zoom.us/j/95881989311> (Passcode: 485387)**

*All are Welcome!*