

Speaker: Frans Oort

Title: CM liftings of abelian varieties

Abstract: Let A be an abelian variety over a finite field. Tate proved (1966) that A is a CM abelian variety. We study: Question. Does there exist a CM lifting to characteristic zero? In 1941 Deuring showed the answer to be positive for elliptic curves. Weil's RH (1948) in positive characteristic, and Honda-Tate theory (1968) gave access to these problems in general. However, it took more than 50 years after Deuring's result before counter examples in the general case appeared. Now we have complete (and surprising) answers to various questions that can be asked for the problem of CM liftings. These are published in the book C-L. Chai – B. Conrad – FO: *Complex multiplication and lifting problems*. We will discuss various questions, give examples and complete answers. We will pay special attention to the difference of CM theory in characteristic zero and in positive characteristic. A proof of the main theorem will be given in full in a crucial example that illustrates obstacles and methods.