

COURSE DESCRIPTION FOR “CHARACTERS OF FINITE GROUPS OF LIE TYPE”

The main aim of this summer school is to introduce the basic ideas as well as the fundamental results on characters of finite groups of Lie type and to present some applications. (Note that almost all finite simple groups arise in this way, up to extensions by finite abelian groups.) In the eighties, G. Lusztig gave a geometrical and combinatorial parametrisation of the complex characters of these groups. These results had an important impact and a wide number of applications within representation theory as well as in other branches of mathematics such as group theory, geometry and number theory.

The parametrisation of Lusztig works best when the centre of the underlying algebraic group is trivial (or, more generally, connected). The general case involves some intricate choices of representatives of conjugacy classes and of normalisations of some geometrically defined functions. The second objective of the school is to describe and isolate the problems behind these difficulties, to explain the known methods to overcome these complications and to solve them in an approach turned towards concrete applications.

The literature available on this topic, in particular the fundamental book of Lusztig from 1984, is not easily accessible to non specialists nor to researchers wanting to apply the theory. Another purpose of the school is to give a guided tour through the specialised literature.

The two main speakers are Professor Meinolf Geck and Professor Gunter Malle, two top class researchers and algebraists of worldwide reputation and specialists of Lusztig's theory briefly exposed above. Apart from being experts of the theory, they are excellent lecturers and have a project of writing a book on the topic. The summer school will be an opportunity to treat some of the themes present in their future book.