Mathematisches Forschungsinstitut Oberwolfach

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Automorphic Forms: New Directions

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Abstract. The workshop on Automorphic Forms: New Directions provided a nice glimpse of the many streams of current research activity in this very active area. Topics included the relative trace formula and periods of automorphic forms, Arthur packets and locally/globally generic representations, Eisenstein cohomology, special values of L-functions, algebraic modular forms, p-adic modular forms, arithmetic theta functions, endoscopy and CAP representations, and proofs of the Gross-Prasad conjecture and the local Langlands conjecture for GL(n). The group of participants was notably broad in terms of nationality and age and the meeting confirmed the continued vigor of research in the field of automorphic representations.

Mathematics Subject Classification (2000): 11Fxx.

Introduction by the Organisers

The theory of automorphic representations has been an extremely active area of research over the past four decades since the introduction of the powerful tools of representation theory into the classical theory of automorphic forms by Langlands, Harish-Chandra, Piatetski-Shapiro and others. The subject already had very deep roots in number theory and geometry and there is now a vast program of conjectures encompassing, on the one hand, the theory of automorphic representations per se and, on the other, Grothendieck's theory of motives. Much progress has been made in recent years. The main goal of this meeting was to survey the most recent developments and to provide a glimpse of the new directions that are opening up, where one might imagine important future growth will take place. The wide range of current research was evident as topics included: periods of automorphic representations and the relative trace formula (Lapid, Feigon, Sakellaridis),

Arthur packets, locally and globally generic representations and the Ramanujan conjecture (Shahidi), Eisenstein cohomology and applications to special values of L-functions (Harder, Grbac), algebraic modular forms (Buzzard), p-adic modular forms (Mahnkopf) and automorphic forms valued in arithmetic Chow groups (Liu), endoscopic transfer and CAP representations (Soudry, Jiang), automorphic forms on covering groups (Ikeda, Savin), and existence questions (Muic). Two highlights were the lecture by Waldspurger detailing his proof of the local Gross-Prasad conjecture for orthogonal groups and the lecture by Scholze explaining his new proof of the local Langlands conjecture for GL(n). The group of participants was notably broad in terms of nationality and age, and the meeting confirmed the continued vigor of research in the theory of automorphic representations.

There were 44 participants, coming mainly from Europe, North America and Asia, among them 4 young researchers who participated as Oberwolfach Leibniz Graduate Students and 2 US Junior Oberwolfach Fellows. The organizers are very grateful to the Leibniz-Gemeinschaft and the NSF for this support. The staff of the Mathematische Forschungsinstitut Oberwolfach was - as always - extremely supportive and helpful. We thank them for providing excellent working conditions.