

## The cohomology of $p$ -adic symmetric spaces

seminar program, summer term 2008

- 1.: A primer on rigid geometry (including basics on Stein spaces); cf. [1], [2] and [6]
- 2.: The  $p$ -adic upper half spaces; cf. [7], section 1
- 3.: Derived categories (including hypercohomology; explain the meaning of  $D^b$ ,  $D^+$ ,  $\otimes^L$  and  $\varprojlim^{(1)}$ ); cf. [4] and [5]
- 4.: Abstract, de Rham and étale cohomology; cf. [7], section 2 up to Proposition 4 (excl.)
- 5.: Spectral sequences (including general material); cf. [7], rest of section 2, and [4]
- 6.: The Tits building and the Bruhat-Tits building of  $\mathrm{GL}_{d+1}$ ; cf. [3] and [8], section I.1
- 7.: Drinfeld vs. Tits I; cf. [7], section 3 up to Lemma 3 (incl.)
- 8.: Drinfeld vs. Tits II; cf. [7], rest of section 3
- 9.: Distributions on flag manifolds; cf. [7], first part of section 4 including the remarks after Corollary 6
- 10.: Harmonic cochains I; cf. [7], second part of section 4 up to Lemma 12 (incl.)
- 11.: Harmonic cochains II; cf. [7], rest of section 4
- 12.: Quotients (construct the variety  $X_\Gamma$  and the spectral sequence associated with the covering  $X \rightarrow X_\Gamma$ ); cf. [7], section 5 up to Lemma 3 (incl.)
- 13.: Extensions of generalized Steinberg representations; cf. [7], section 5 up to Proposition 8 (incl.)
- 14.: Duality Theorem; cf. [7], section 5 up to Theorem 5 (incl.)

## References

- [1] S. BOSCH: Lectures on Formal and Rigid Geometry, *Preprintreihe SFB 478*, Heft **378**, 2005
- [2] S. BOSCH, U. GÜNTZER, R. REMMERT: *Non-Archimedean Analysis*, Grundlehren der mathematischen Wissenschaften **261**, Springer, 1984
- [3] K. BROWN: *Buildings*, Monographs in Mathematics, Springer, 1998
- [4] S.I. GELFAND, YU.I. MANIN: *Methods of Homological Algebra*, Springer, 1996

- [5] B. KELLER: Derived categories and their uses, *preprint*, available at <http://www.math.jussieu.fr/~keller/publ/index.html>
- [6] R. KIEHL: Theorem A und Theorem B in der nichtarchimedischen Funktionentheorie, *Inv. Math.* **2**, 1967, pp. 256 – 273
- [7] P. SCHNEIDER, U. STUHLER: The cohomology of  $p$ -adic symmetric spaces, *Inv. Math.* **105**, 1991, pp. 47–122
- [8] P. SCHNEIDER, U. STUHLER: Representation theory and sheaves on the Bruhat-Tits building, *Publ. Math. IHES* **85**, 1997, pp. 97–191