

### Seminar on Crystalline Cohomology

- 1) **Divided powers for ideals (Yingying Wang, 06.11/13.11.2019):**  
Present [BO] §3, 3.1-3.18.
- 2) **Divided powers for schemes (Christoph Spenke, 20.11.2019):**  
Present [BO] §3, 3.19-3.35.
- 3) **De Rham cohomology as infinitesimal cohomology (expository talk for motivation) (Roland Huber, 27.11.2019):**  
Present [BO] p 1.11. For proofs see [BO] §2 and [G].
- 4) **Calculus with Divided Powers (Georg Linden, 04.12.2019):**  
Present [BO] §4.
- 5) **Sites, topoi, sheaves and cohomology, crystalline site (Martin Bender, 11.12.2019):**  
Recall the definition of a Grothendieck topology, site and topos. Examples may also be helpful. Possible references are [T] chapter 1 and [V] 2.3. Afterwards present [BO] §5, 5.1-5.3.
- 6) **Crystalline cohomology (Dennis Peters, 18.12.2019):**  
Present [BO] §5, 5.15-5.29.
- 7) **Crystals (Georg Linden, 08.01.2020):**  
Present [BO] §6, 6.1-6.8.
- 8) **Crystals II, crystalline Poincaré lemma (Christoph Spenke, 15.01.2020):**  
Present [BO] §6, 6.9-6.23.
- 9) **Comparison with de Rham cohomology (Siddharth Mathur, 22.01.2020):**  
Present [BO] §7, 7.1-7.5.
- 10) **Frobenius and Hodge filtration (Yingying Wang, 29.01.2020):**  
Present [BO] §8.

For all talks it may also be helpful too look at [SP, Tag 07GI]

#### REFERENCES

- [BO] P. Berthelot, A. Ogus, *Notes on crystalline cohomology*, Princeton University Press (1978)  
[G] A. Grothendieck, *Crystals and the de Rham cohomology of schemes*, Dix Exposés sur la Cohomologie des schémas, Advanced Studies in Pure Mathematics Volume 3, North Holland (1976), 306-358  
[T] G. Tamme, *Introduction to Étale Cohomology*, Springer (1994)  
[SP] The Stacks Project Authors, Stacks Project. <http://stacks.math.columbia.edu> (2019)  
[V] A. Vistoli, *Notes on Grothendieck topologies*, arXiv:math/0412512 [math.AG] (2007)