

## Exposé court

### **14** *Cycle identities in the affine grassmannian and applications to Breuil–Mézard for crystalline representations*

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The Breuil–Mézard conjecture is a combinatorial shadow of the currently hypothetical  $p$ -adic Langlands correspondence. It describes the geometry, at the level of cycles, of special fibres of moduli spaces of  $n$ -dimensional potentially crystalline in terms of the mod  $p$  representation theory of  $\mathrm{GL}_n$ .

In this talk I will give an overview of results from my recent paper (arXiv:2305.06455) which establish new results towards this conjecture, as well as generalisations in which  $\mathrm{GL}_n$  is replaced by a split reductive group  $G$ . This is done by relating the geometry of moduli of crystalline representations with sufficiently small Hodge–Tate weights to certain degenerations of products of flag varieties in the affine grassmannian for  $G$ , and then describing these degenerations in terms of the representation theory of the dual group  $\widehat{G}$ .