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The convergent topos in characteristic p . (English) [Zbl 0728.14020](#)

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[For the entire collection see [Zbl 0717.00010](#).]

The notion of enlargement (known) and the more general notion of widening of a scheme X over a discrete valuation ring V in characteristic p are introduced. Enlargements form a Grothendieck category \underline{E} and sheaves on this category form the convergent topos $(X/V)_{conv}$. A crystal of $\mathcal{O}_{X/V}$ -modules is a sheaf F in this topos such that for $g : S' \rightarrow S$ in \underline{E} one has an isomorphism $\rho_g : g_S^*(E_S) \rightarrow E_{S'}$. Some basic results and then the existence of the universal enlargement as a direct limit of enlargements are shown.

A fully faithful functor from widenings to $(X/V)_{conv}$ is defined. Some cohomological results related to affine widenings are developed. Convergent cohomology is shown independent of infinitesimal thickenings. If $\mathcal{K}_{X/V}$ is the tensor product of the field of fractions K of V with $\mathcal{O}_{X/V}$, the author shows, for instance, that $H_{conv}^i(X/V, \mathcal{K}_{X/V}) \simeq K \otimes H_{DR}^i(Y/V)$ if Y/V is a smooth formal lifting of X/k . Finally, the category of convergent isocrystals on X/V is shown to be a full subcategory of the category of crystals. Here, the category of isocrystals is the category with crystals as objects which are finite type $\mathcal{O}_{X/V}$ -modules and where the morphisms are elements of $K \otimes Mor_{cris}(E, F)$.

Reviewer: P.Cherenack (Rondebosch)

MSC:

- [14F30](#) p -adic cohomology, crystalline cohomology
- [14F20](#) Étale and other Grothendieck topologies and (co)homologies
- [18F10](#) Grothendieck topologies and Grothendieck topoi

Cited in 1 Review Cited in 11 Documents
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Keywords:

[enlargement](#); [widening of a scheme](#); [category of convergent isocrystals](#)