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## Top local cohomology, Matlis duality and tensor products

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## Abstract

Let  $\mathfrak{a}$  be an ideal of a local ring  $(R, \mathfrak{m})$  with  $d = \dim R$ . This talk is two folded:

Of particular interest are the so-called top local cohomology modules, that is,  $H^t_{\mathfrak{a}}(R) \neq 0$  where  $H^i_{\mathfrak{a}}(R) = 0$  for all i > t. In the light of a result of Huneke and Lyubeznik, vanishing of the local cohomology modules  $H^i_{\mathfrak{a}}(R)$ , for i = d, d - 1 paving the ground for connectedness results.  $H^d_{\mathfrak{a}}(R)$  has been understood well. In this talk we express some properties of  $H^{d-1}_{\mathfrak{a}}(R)$ .

Next we examine the Cohen-Macaulayness of  $D(H^d_{\mathfrak{a}}(R))$ , Matlis dual of  $H^d_{\mathfrak{a}}(R)$ where d > 2. Then  $H^d_{\mathfrak{a}}(R) \otimes H^d_{\mathfrak{a}}(R)$ ,  $D(H^d_{\mathfrak{a}}(R)) \otimes D(H^d_{\mathfrak{a}}(R))$  and  $H^d_{\mathfrak{a}}(R) \otimes D(H^d_{\mathfrak{a}}(R))$ are examined. In particular, we give the necessary and sufficient condition for Cohen-Macaulayness of  $D(H^d_{\mathfrak{a}}(R)) \otimes_{R/Q} D(H^d_{\mathfrak{a}}(R))$ , where Q is a certain ideal of R.