Zeta Functions of Laurent Polynomials

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This talk is about singularities over $p-$adic fields, a topic which has received a lot of attention lately. Here we study local zeta functions attached to Laurent polynomials over $p-$adic fields, with the condition of being non-degenerate with respect to their Newton polytopes at infinity. As an application we obtain asymptotic expansions for $p-$adic oscillatory integrals attached to Laurent polynomials. We show the existence of two different asymptotic expansions for such integrals, one when the absolute value of the parameter approaches infinity, the other when the absolute value of the parameter approaches zero. These two asymptotic expansions are controlled by the poles of twisted local zeta functions of Igusa type. This is a joint work with W. A. Zúñiga-Galindo.