

# ELLIPTIC CURVES OVER LOCAL FIELDS

$K$  local field, complete wrt. a discrete valuation  $\nu$

$R$  ring of integers of  $K = \{x \in K : \nu(x) \geq 0\}$

$R^\times$  unit gp of  $R = \{x \in K : \nu(x) = 0\}$

$\mathcal{M}$  max'l ideal of  $R = \{x \in K : \nu(x) > 0\}$

$\pi$  a uniformizer for  $R$ ,  $\mathcal{M} = \pi R$ .

$k = R/\mathcal{M}$  the residue field,  $p = \text{char}(k)$

ex  $K = \mathbb{Q}_p$ ,  $\nu = \nu_p$  st.  $\nu_p(a) = \nu_p(m \cdot p^n) = n$   
 $R = \mathbb{Z}_p$ ,  $1$

$a \in \mathbb{Z}$

$a = m p^n$ ,  $\text{gcd}(m, p) = 1$

























