

**Title:** On a characterization theorem on non-discrete totally disconnected locally compact fields

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We prove the following theorem. Let  $X$  be a non-discrete totally disconnected locally compact field,  $R$  be its ring of integers,  $P$  be the nonzero prime ideal of  $R$ . Assume that the residue field  $R/P$  is a field of characteristic  $p > 2$ . Let  $\xi$  and  $\eta$  be independent identically distributed random variables with values in  $X$  and distribution  $\mu$ , such that  $\mu$  has a continuous density with respect to a Haar measure on  $X$ . This implies that the random variables  $S = \xi + \eta$  and  $D = (\xi - \eta)^2$  are independent if and only if  $\mu$  is a shift of the Haar distribution of a compact subgroup of  $X$ .

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