

**Lemma 7.17** Let  $(\mathbf{X}', \mathbf{Y}')$  be  $n$  i.i.d. copies of a pair of generic random variables  $(X', Y')$ , where  $X' \sim X$ ,  $Y' \sim Y$ , and  $X'$  and  $Y'$  are independent. Then

$$\Pr\{(\mathbf{X}', \mathbf{Y}') \in T_{[XY]_{\delta}}^n\} \leq 2^{-n(I(X;Y) - \tau)},$$

where  $\tau \rightarrow 0$  as  $\delta \rightarrow 0$ .