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On the conductor of certain local L -functions. (English summary)

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Let W'_F be the Weil-Deligne group of a p -adic field F and let (π_1, π_2) be a pair of supercuspidal representations of a general linear group over F . Let $\rho_{\pi_i}: W'_F \rightarrow GL_{n_i}(C)$ be the Langlands parameter of π_i . In [J. Amer. Math. Soc. **11** (1998), no. 3, 703–730; [MR1606410](#)], C. J. Bushnell, G. M. Henniart and P. C. Kutzko provided an explicit formula for the conductor $f(\pi_1 \times \pi_2)$. Under the local Langlands correspondence, the conductor $f(\pi_1 \times \pi_2)$ equals the Artin conductor of $\rho_{\pi_1} \otimes \rho_{\pi_2}$, hence $f(\pi_1 \times \pi_2)$ is the conductor of the tensor product lift of $\pi_1 \boxtimes \pi_2$. In the spirit of [op. cit.], in the present paper the authors compute the conductor of two other functorial lifts, namely,

- (1) the symmetric square lift and the
- (2) the external square lift,

assuming that the residue characteristic is odd. For the calculations, the authors exploit the connection between the tensor product lift and the functorial lifts, namely:

$$\rho_{\pi} \times \rho_{\pi} \simeq \text{Sym}^2 \rho_{\pi} \oplus \wedge^2 \rho_{\pi}.$$

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