

# Accepted Manuscript

Electro-elastic instabilities in cross-shaped microchannels

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PII: S0377-0257(17)30540-2  
DOI: [10.1016/j.jnnfm.2018.04.004](https://doi.org/10.1016/j.jnnfm.2018.04.004)  
Reference: JNNFM 4003

To appear in: *Journal of Non-Newtonian Fluid Mechanics*

Received date: 23 November 2017  
Revised date: 6 April 2018  
Accepted date: 9 April 2018

Please cite this article as: F. Pimenta , M.A. Alves , Electro-elastic instabilities in cross-shaped microchannels, *Journal of Non-Newtonian Fluid Mechanics* (2018), doi: [10.1016/j.jnnfm.2018.04.004](https://doi.org/10.1016/j.jnnfm.2018.04.004)



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**Highlights**

- Electroosmotic flows of viscoelastic fluids are experimentally investigated.
- Cross-slot and flow-focusing micro-devices are used.
- Electro-elastic instabilities occur at low Weissenberg numbers.
- Numerical simulations performed are in qualitative agreement with experiments.
- Important role of the shear flow inside the electric double layer.

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