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Reply to "Comment on 'Charge transport in disordered semiconducting polymers driven by nuclear tunneling'"

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Reply to “Comment on ‘Charge transport in disordered semiconducting polymers driven by nuclear tunneling’”N. J. van der Kaap,¹ I. Katsouras,^{2,3} K. Asadi,² P. W. M. Blom,² L. J. A. Koster,¹ and D. M. de Leeuw²¹*Zernike Institute for Advanced Materials, University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands*²*Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany*³*Holst Centre, High Tech Campus 31, 5656 AE Eindhoven, The Netherlands*

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The authors reply to the Comment by Nenashev *et al.*DOI: [10.1103/PhysRevB.102.066202](https://doi.org/10.1103/PhysRevB.102.066202)

We welcome the comment by Nenashev *et al.* [1]. Indeed, as long as the characteristic frequency of the bath is large enough, nuclear tunneling causes an increasing mobility with electric field, in agreement with experiments, and in contrast to the Miller-Abrahams and Marcus mechanisms. Nenashev *et al.* are, however, correct in pointing out that in the limit of very large electric fields, the exponential

term will cause a decrease in the mobility. This decrease in mobility is neither seen in the experimental data in our paper, nor in the data in the paper by Asadi *et al.* [2], where the nuclear tunneling hop rate was also applied. This suggests that the energy difference in the hopping process is still smaller than the characteristic frequency of the bath.

[1] A. V. Nenashev, F. Gebhard, and S. D. Baranovskii, *Phys. Rev. B* **102**, 066201 (2020).

[2] K. Asadi, A. J. Kronemeijer, T. Cramer, L. J. A. Koster, P. W. M. Blom, and D. M. de Leeuw, *Nat. Commun.* **4**, 1710 (2013).