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## Elastic response of lament networks with active cross-links

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## Abstract content <br> &nbsp; (Max 300 words)

Force and directed motion can be generated by molecular machines on associated laments. Examples of cytoskeletal constituents include kinesins on microtubules. We present a theoretical study of pre-existing, permanent networks of such laments that are cross-linked by linkers consisting of pairs of molecular motors (in addition to the usual permanent, stationary cross-links). First considering the motors as having a translational degree of freedom along the laments, but unable to detach, both the static modications to the elastic response of the network as a function of the motor force as well as the dynamic fluctuations of the cross-linker positions in a steady state of the motors can be calculated in approximations for small forces. For the static case we develop a quasi-equilibrium point of view utilising the replica method to treat the disorder. In the latter dynamic scenario we employ a functional integral approach with appropriate Langevin equations. Secondly, we include the possibility that motors are not permanently attached to the laments. We show how a eld-theoretical technique [R. Fantoni, K.K. Müller-Nedebock, <i>Phys. Rev.</i> E 84 011808 (2011)] enables the inclusion of attachment-detachment statistics of the active cross-links into the formalism. The eld theory also leads to a natural collective formulation for these active systems.

Apply to be<br> consider for a student <br> &nbsp; award (Yes / No)?

No

Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD)?

N/A

## Main supervisor (name and email)<br>and his / her institution

N/A

## Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

No

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