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## **Simulation of shot noise effects in the EIC strong hadron cooling accelerator using real number of electrons**

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The electron ion collider, the next generation nuclear physics collider is being actively studied. In order to achieve the designed luminosity  $10^{34}/\text{cm}^2/\text{s}$  with a reasonable lifetime, an efficient coherent electron cooling scheme was proposed to reduce the hadron beam emittance and counter intrabeam scattering. Such a cooling scheme requires a good electron beam quality with a small energy spread. However, the shot noise in the electron beam through the accelerator might be amplified due to the microbunching instability and might degrade the electron beam quality in the modulator section of the strong hadron cooling channel and correspondingly cooling rate. In this study, we reported on a self-consistent simulation study of these effects using the real number of electrons. This captures the details of shot noise.

### **Funding Agency**

### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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