

Abstract Submitted  
for the DFD20 Meeting of  
The American Physical Society

**Risk Assessment of Airborne Disease Transmission during Wind Instrument Plays**<sup>1</sup> RUICHEN HE, LINYUE GAO, MAXIMILIAN TRIFONOV, JIARONG HONG, University of Minnesota — The potential airborne transmission of COVID-19 has raised significant concerns regarding the safety of wind instrument play. Such problem involves multiple flow process such as aerosol generation from different breathing techniques and aerosol transport into, within, and outside the instrument. By collaborating with 15 musicians from Minnesota Orchestra, we provide the first systematic examination of aerosol generation and transport from 10 types of wind instruments under different dynamic levels and articulation patterns. We conduct the in situ measurements of flow field and aerosol generation during instrument play at the orchestra. We find the aerosol concentration of different instruments exhibits two orders of magnitude variation. The dependence of aerosol production upon dynamic level and articulation pattern varies for different instruments. We obtain the flow field and spatial variation of aerosol concentration associated with different instrument plays. Our results suggest aerosol generation from wind instrument is influenced by a combination of breathing techniques, instrument inlet design, and the tube structure. Based on our findings, we provide suggestions on orchestra seating arrangement to mitigate the risk of airborne disease transmission.

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Date submitted: 10 Aug 2020

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