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**Michael I Ham\***, P.O. Box 1663, Los Alamos, NM 87545. *An Exploration of Novel Filter Material and Mask Performance For Preventing the Spread of COVID-19*. Preliminary report.

Mask wearing by the public has been found to reduce the spread of COVID-19. Masks allow some percentage of small droplets to pass in and out of the material and through gaps where the mask is not sealed to the face. Here we show that the primary benefit of masks is that they significantly reduce the velocity of air moving in and out of the mask while acting as filters that protect both the wearer and those around them from droplets. We demonstrate mask filter efficiency approaches 100% as droplet size increases, a result that becomes important for preventing larger droplets generated while speaking or coughing and sneezing. Our results show that the conventional assessment of mask filtration efficiency in the 300nm-10um range is insufficient for fully assessing mask performance. Combined with statistical inference of droplet virion levels our results demonstrate why masks are able to reduce the spread of COVID-19 because not every droplet from an infected person is likely to have a virion, and every droplet you prevent from entering an uninfected person matters. We apply our results to suggest a metrics that would help better inform consumers when purchasing masks. (Received August 31, 2020)