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Envisaging a world with greener cities

Managing Air for Green Inner Cities - Partner Meeting

Experiments

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Background

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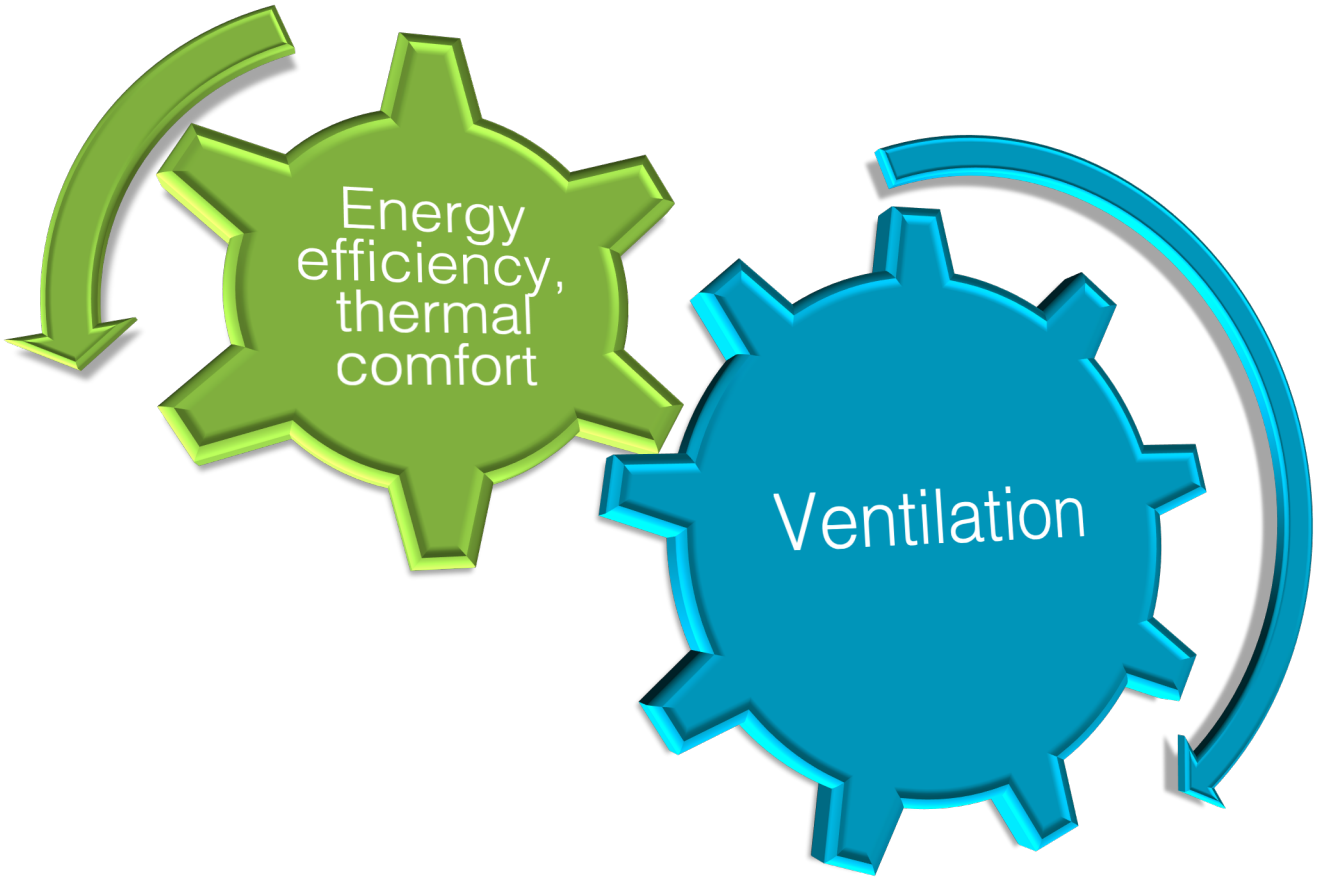

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Flow visualisation

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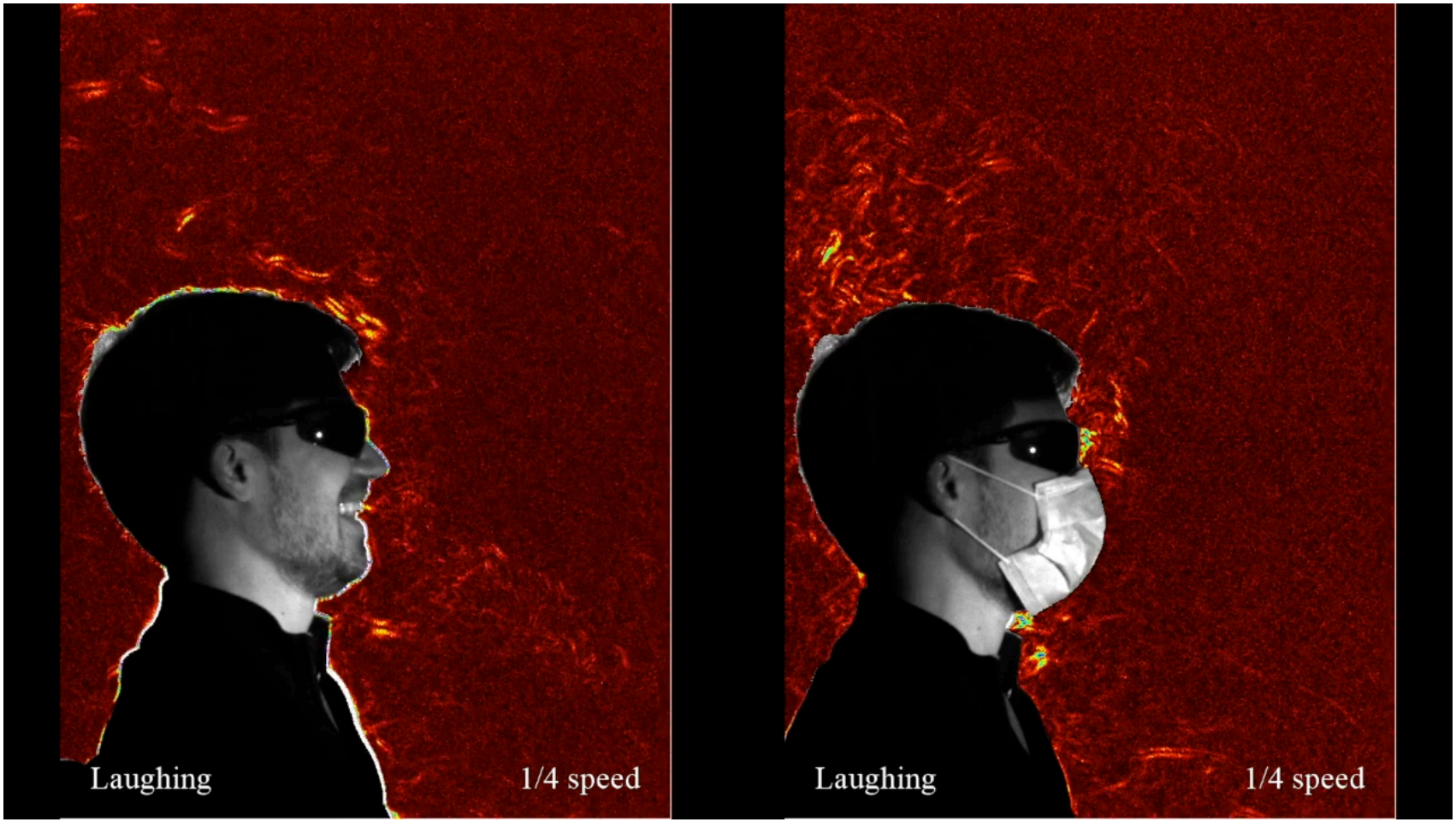

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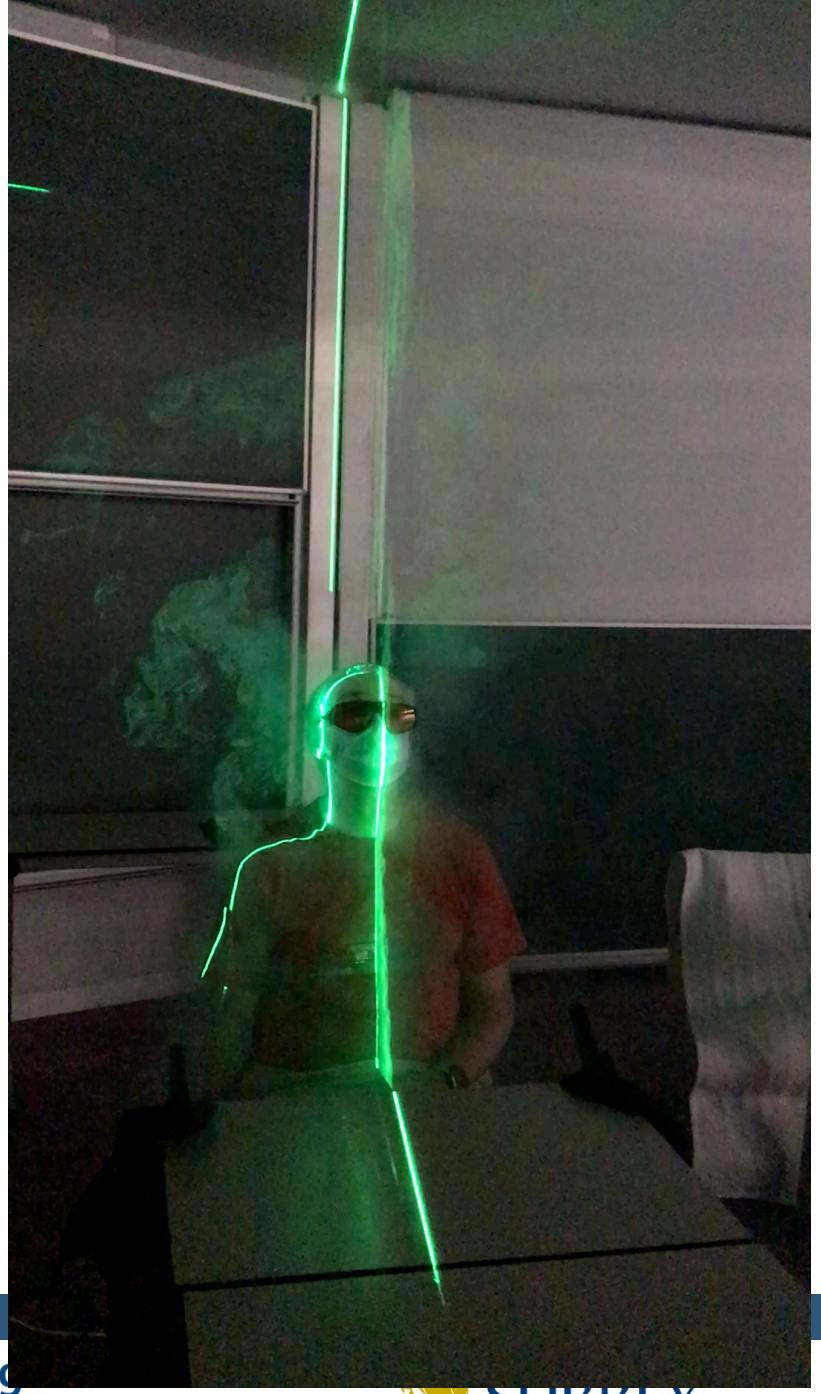

Train carriage

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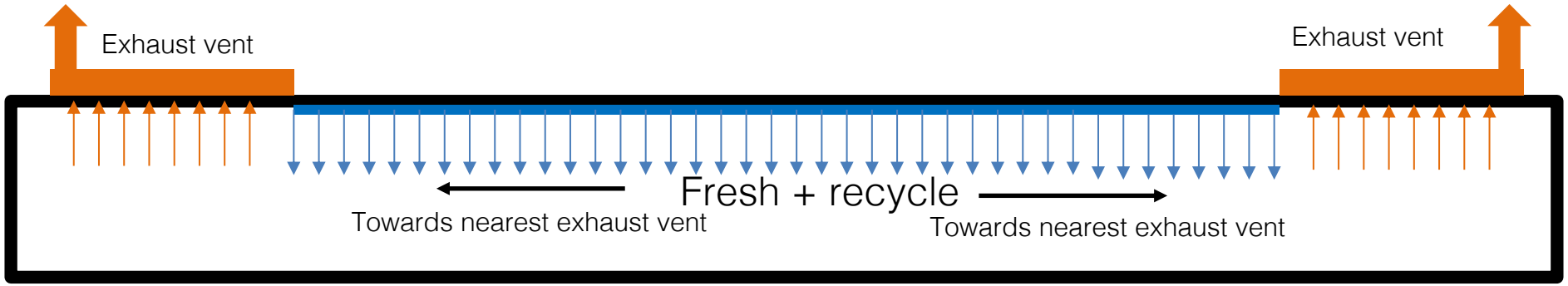

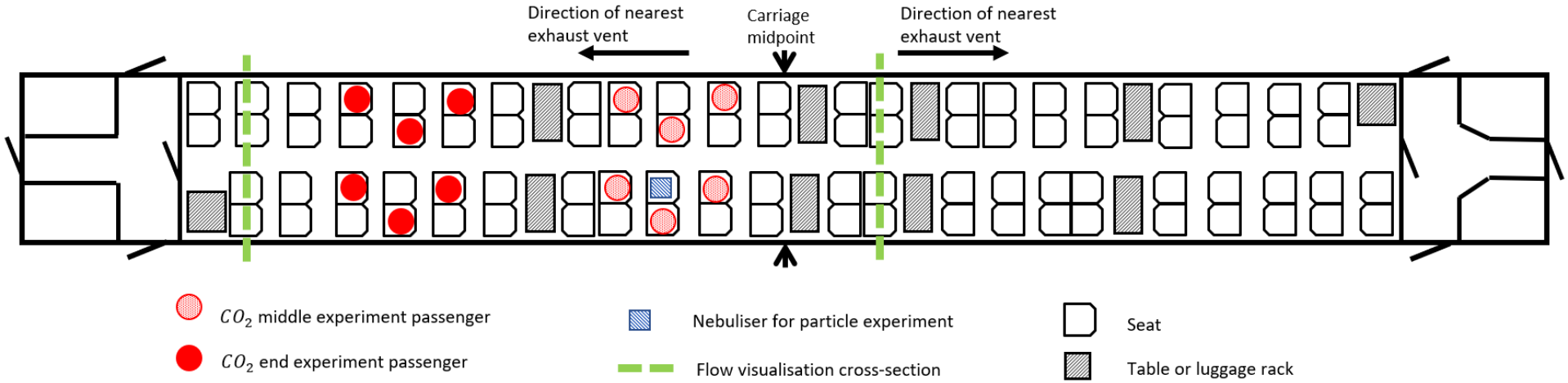

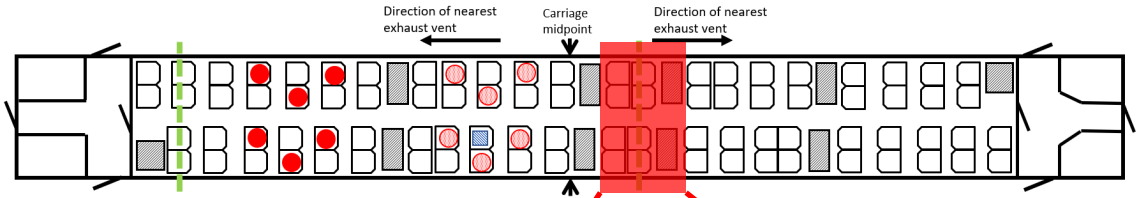

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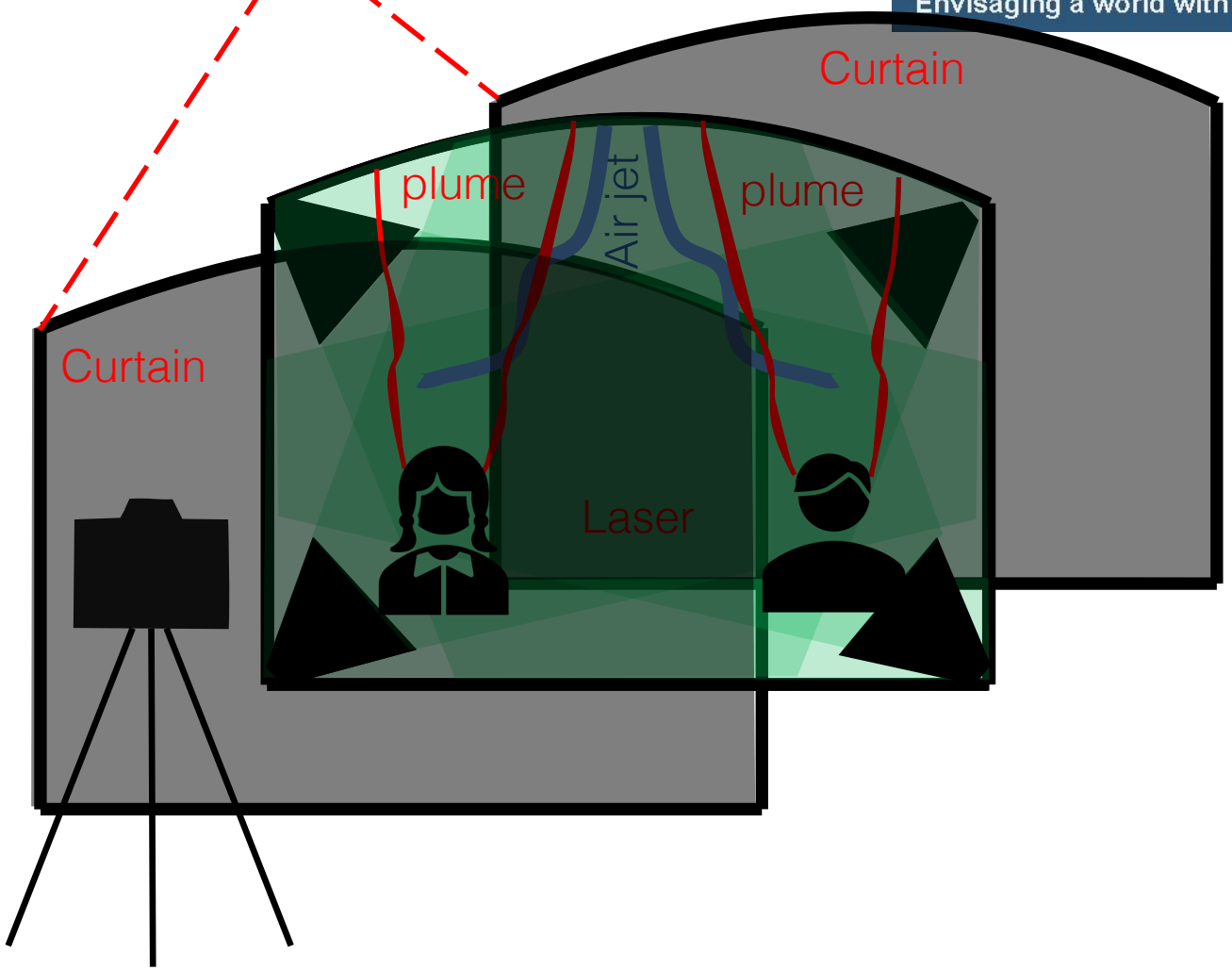

Flow visualisation -1

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Flow visualisation -2

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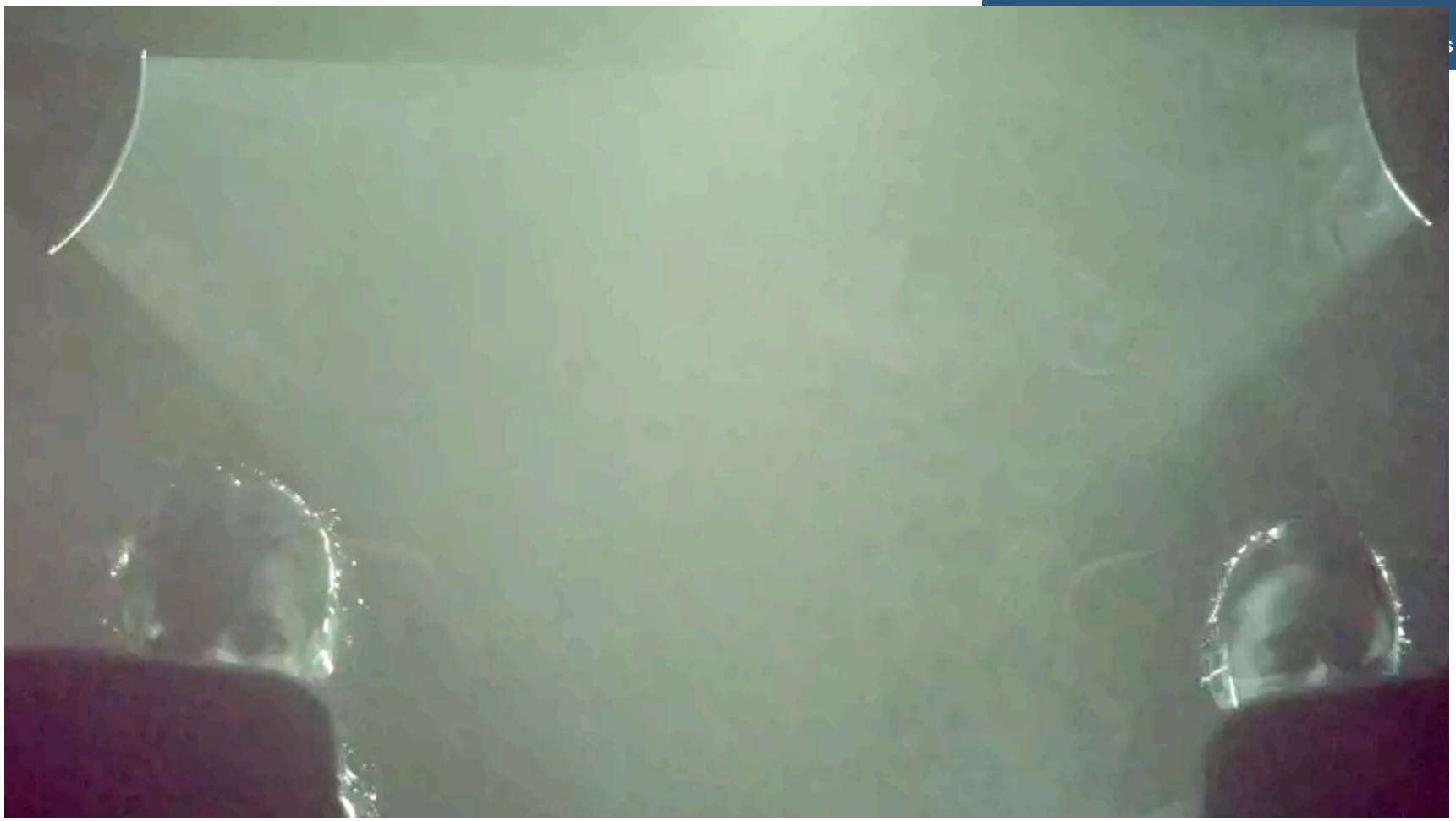

Analytical model for CO_2 concentration

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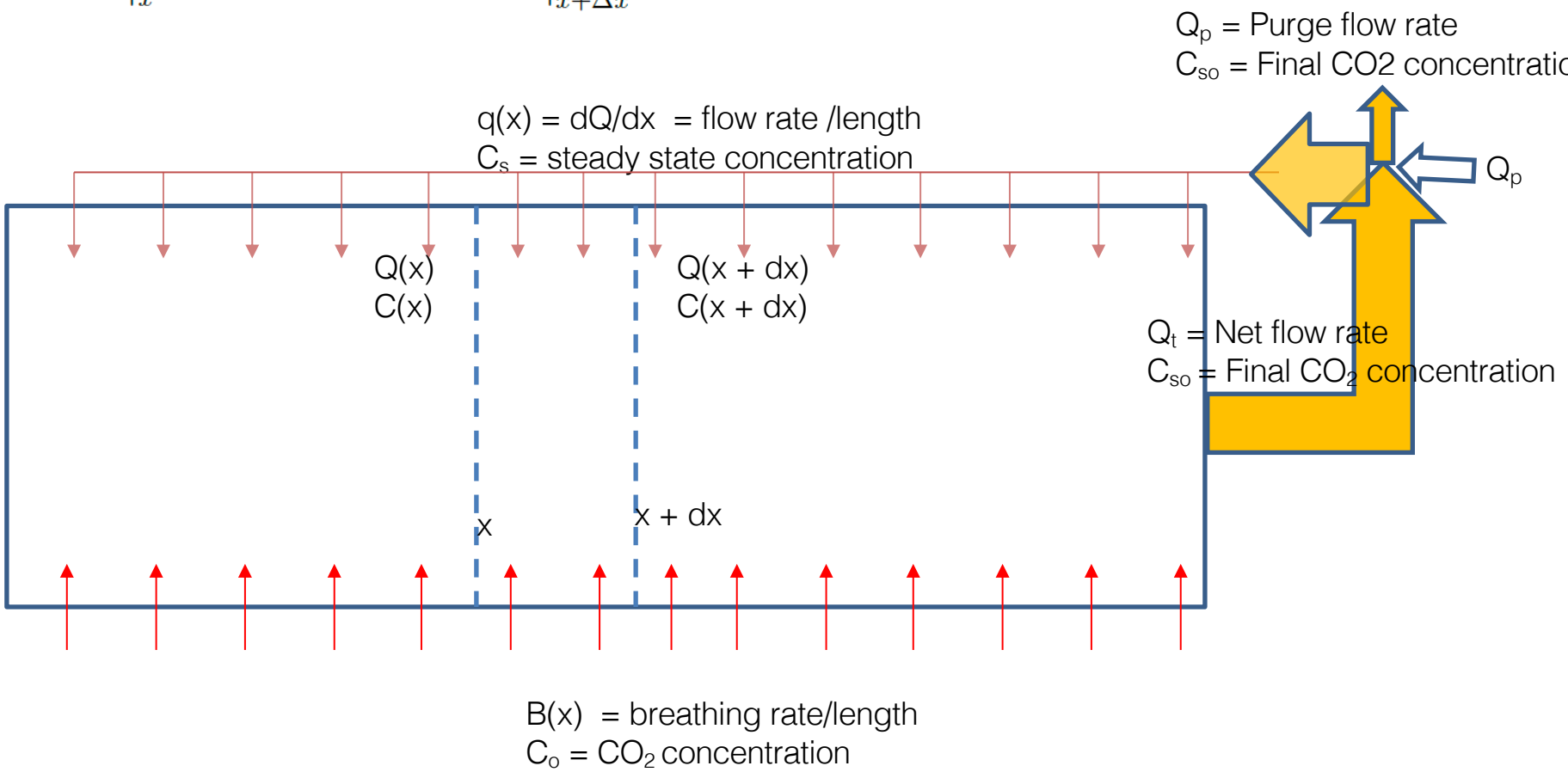
$$Q(x)C((x)\Big|_x - Q(x+\Delta x)C((x+\Delta x)\Big|_{x+\Delta x} + q(x)C_s dx + B(x)C_0 dx = 0$$



Analytical model

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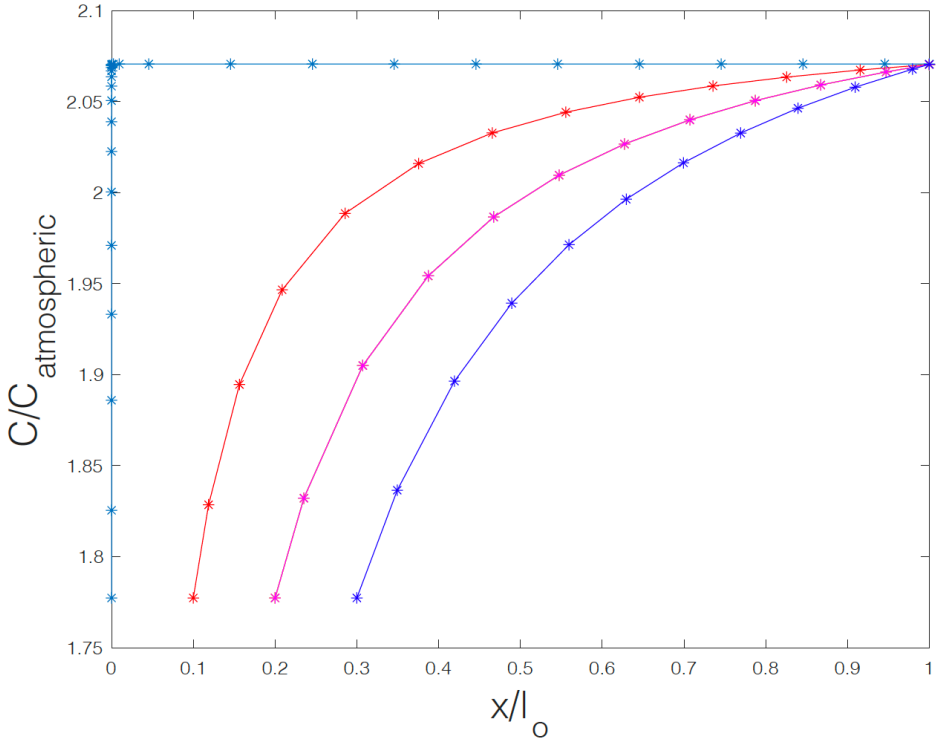
$$Q(x)\frac{dC}{dx} + C(x)\frac{dQ}{dx} = q(x)C_{s0}(1 - \frac{Q_p}{Q_t}) + B(x)C_0$$



For a uniform line jet

$$x\frac{dC}{dx} + C(x) = C_s + B(x)C_0$$

Analytical solution for an uniform line source

$$C(x) = C_s + BC_0 - \frac{BC_0x_0}{x}$$

Indoor pollutant transport

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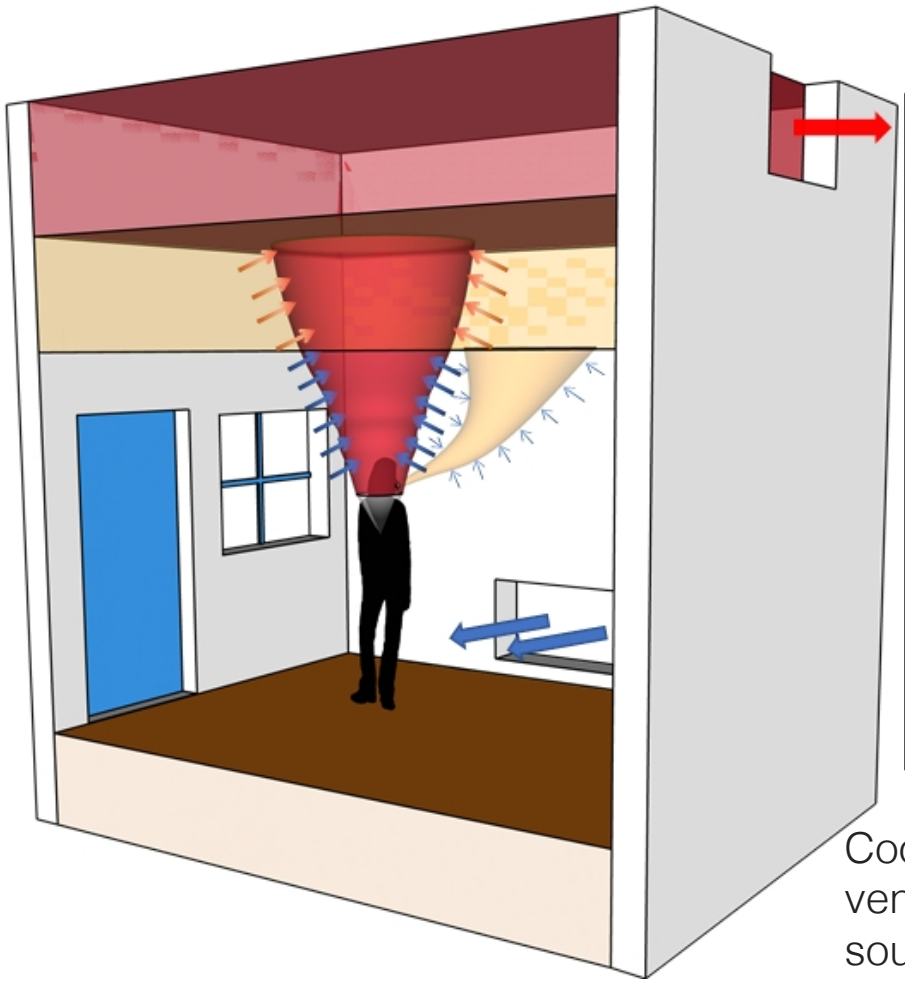

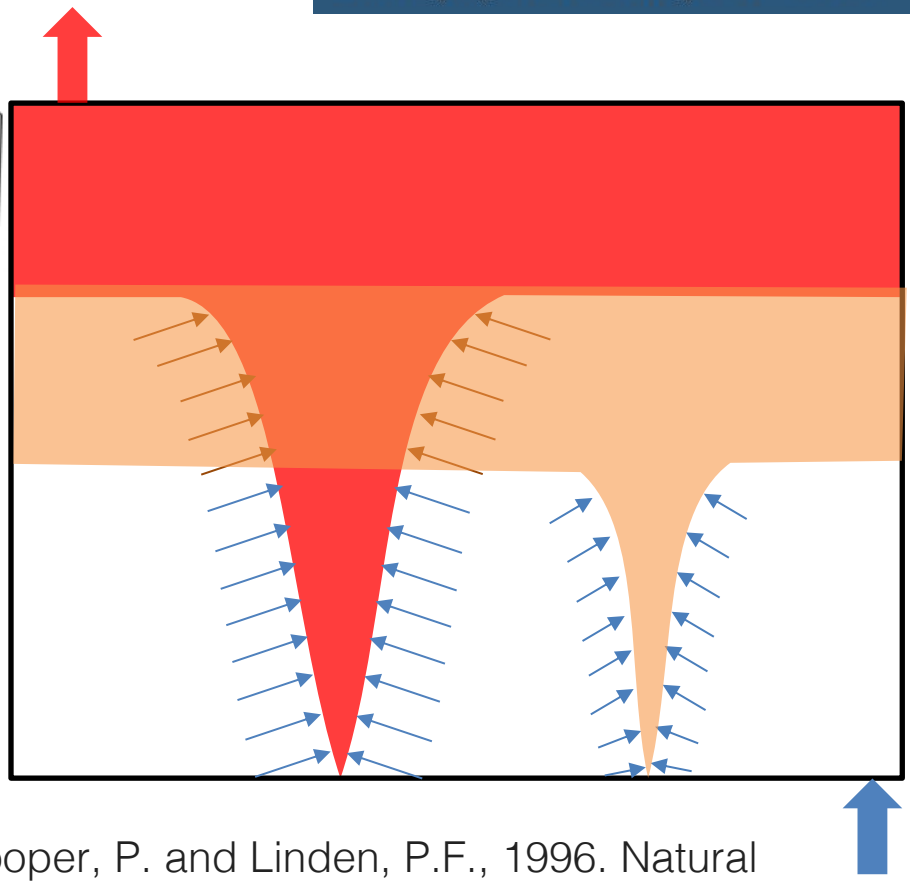

Cooper, P. and Linden, P.F., 1996. Natural ventilation of an enclosure containing two buoyancy sources. Journal of Fluid Mechanics, 311, pp.153-176.

Future work

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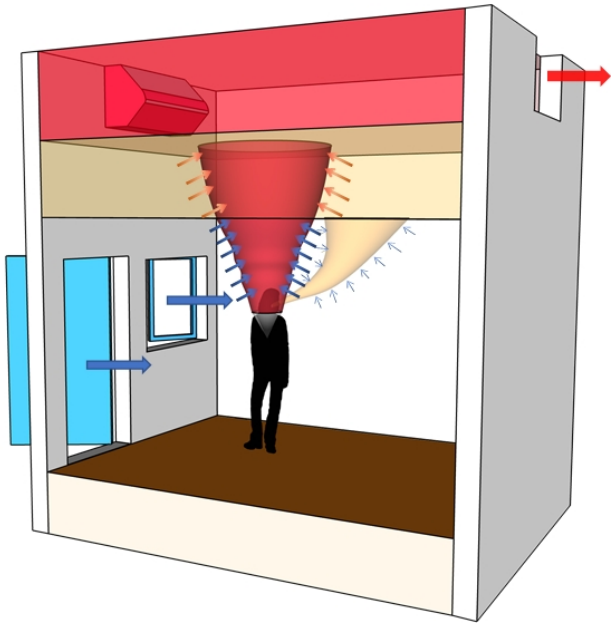
- Water flume experiments on indoor transport of pollutants
- Indoor outdoor exchange - Single sided ventilation; wind direction
- Single sided ventilation; Heat vs wind
- Qualitative to quantitative measurement of full scale flow



Agenda

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- Full scale flow visualisation
- Indoor transport of pollutants
- Ventilation in buses and trains
- Future studies