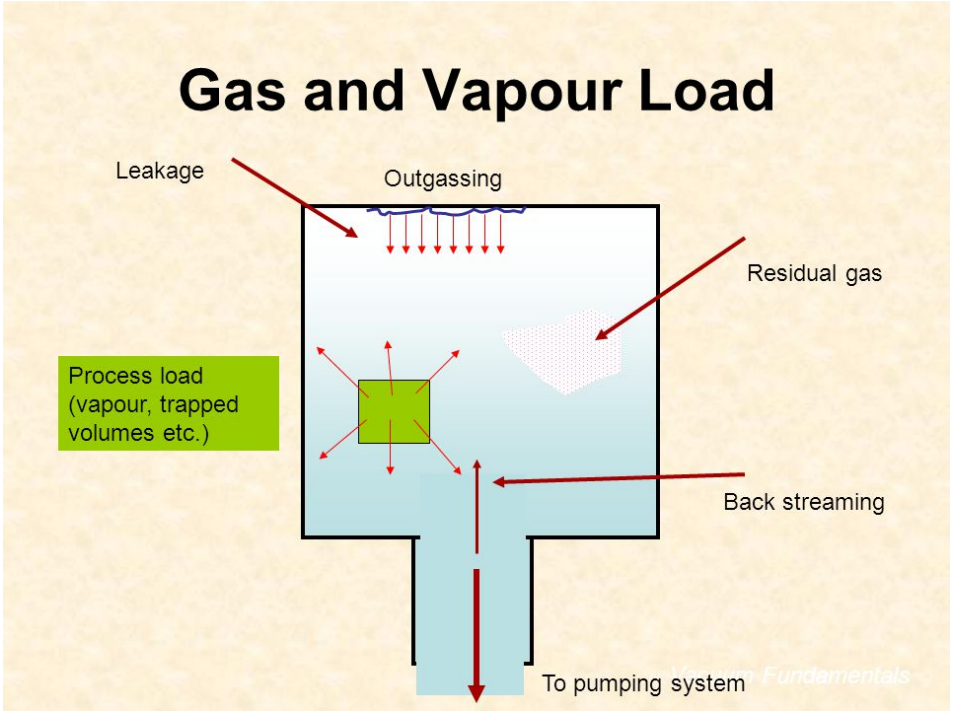
Vacuum IDEAL pump down basic theory

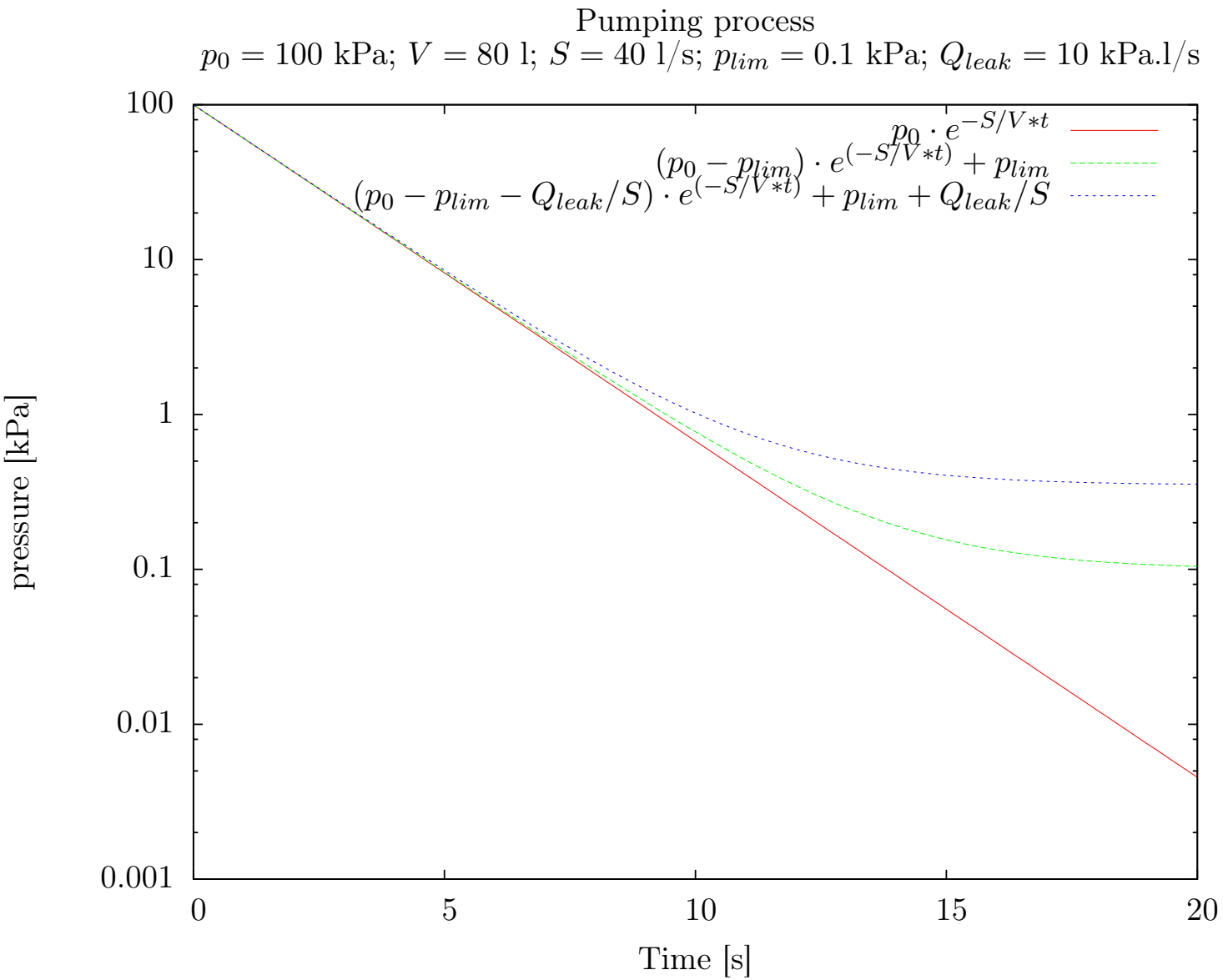


credit:[Nash, 2015]

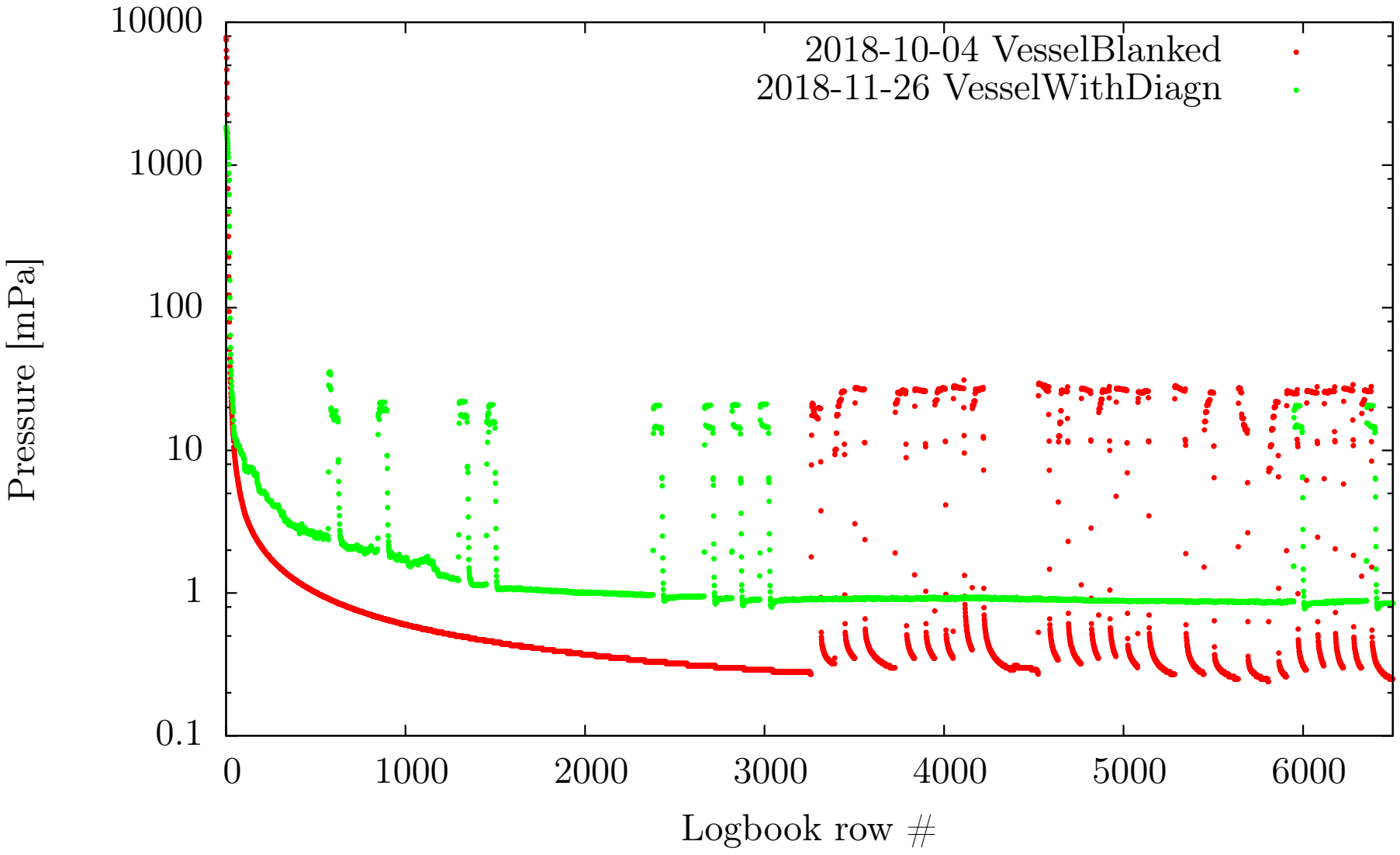
- Volume V [l].
- Pumping speed S [l/s].
- pressure $p(t)$ [Pa].
- initial pressure p_0 [Pa].
- Basic pump-down equation: $V\frac{dp}{dt} = -S \cdot p$.

- Basic pump down time evolution: $p(t) = p_0 \cdot e^{-S/V*t}$
- .. with p_{lim} limite pressure: $p(t) = (p_0 - p_{lim}) \cdot e^{(-S/V*t)} + p_{lim}$
- .. with Q_{leak} leakage:
  $p(t) = (p_0 - p_{lim} - Q_{leak}/S) \cdot e^{(-S/V*t)} + p_{lim} + Q_{leak}/S$

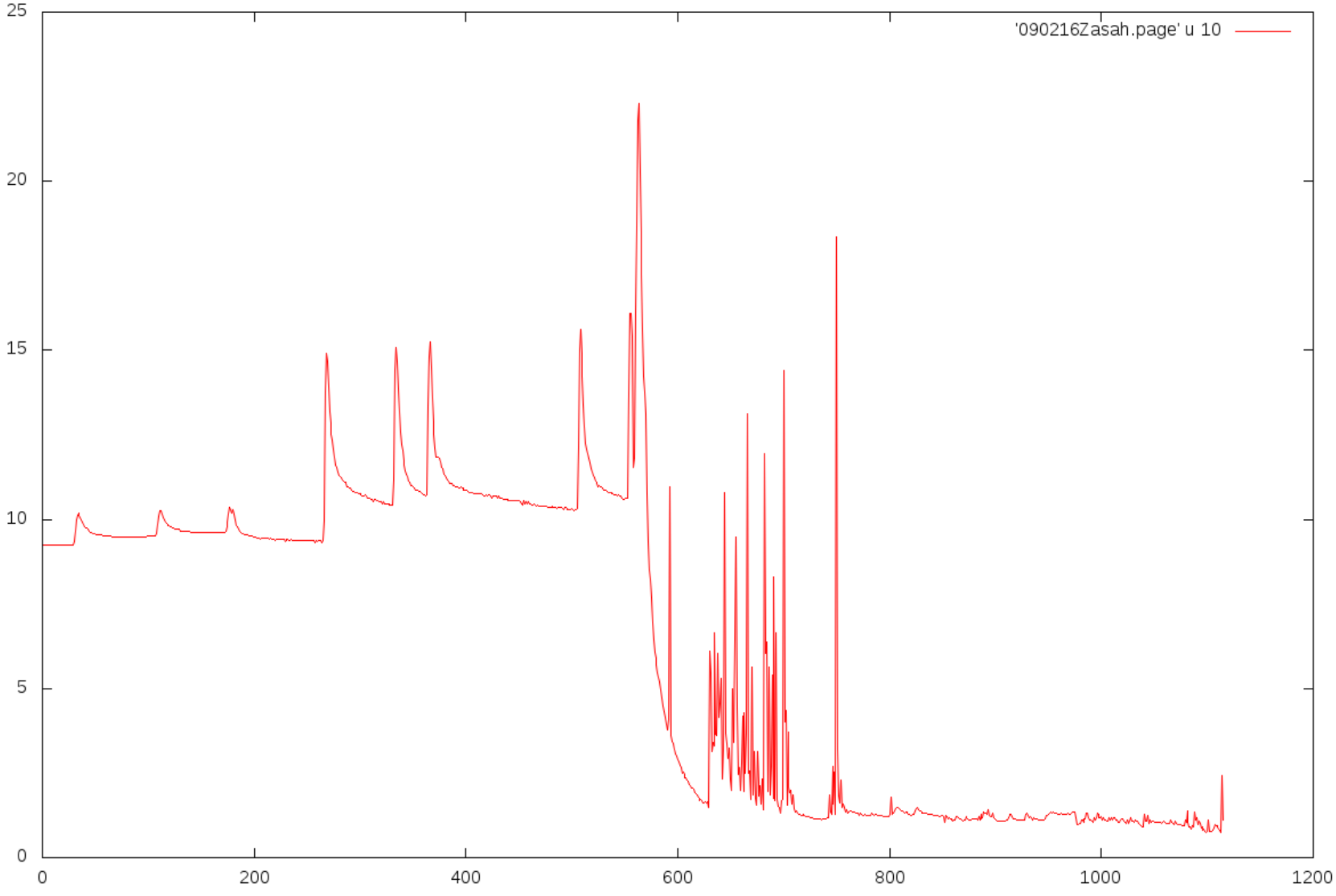
Pump down process - model



Vacuum condition after a DAS addition



Vacuum leakage hit



References I

Nash, P. (2015). High-Vacuum Technology Course. [Online; accessed December 16, 2018].