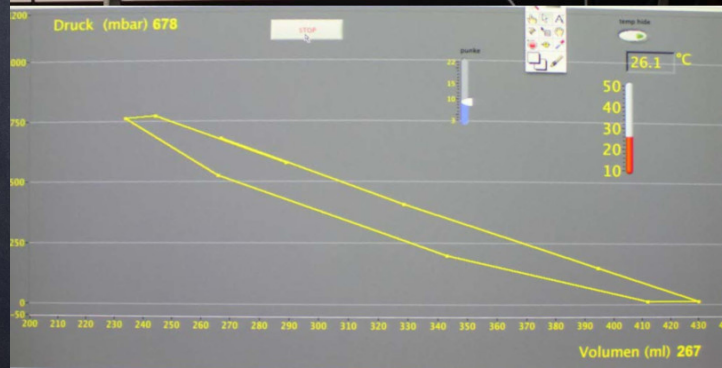
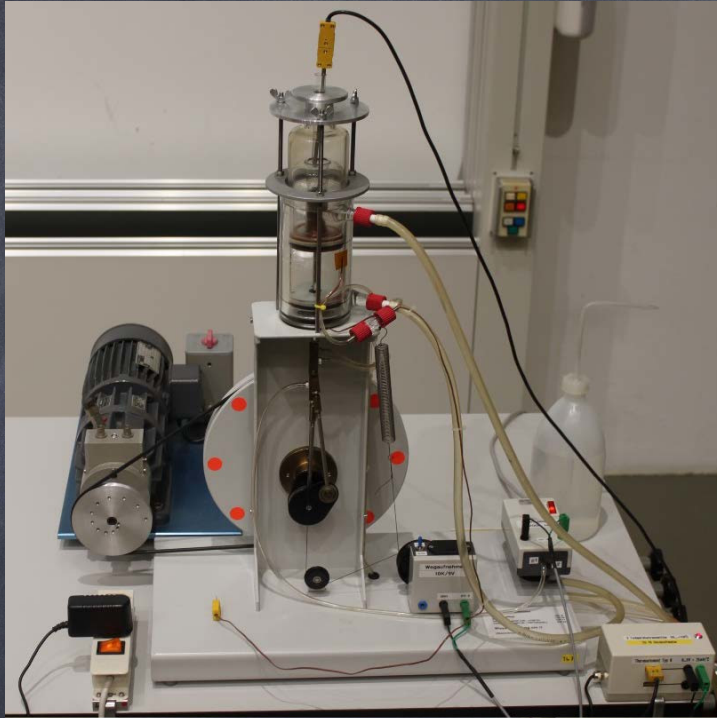


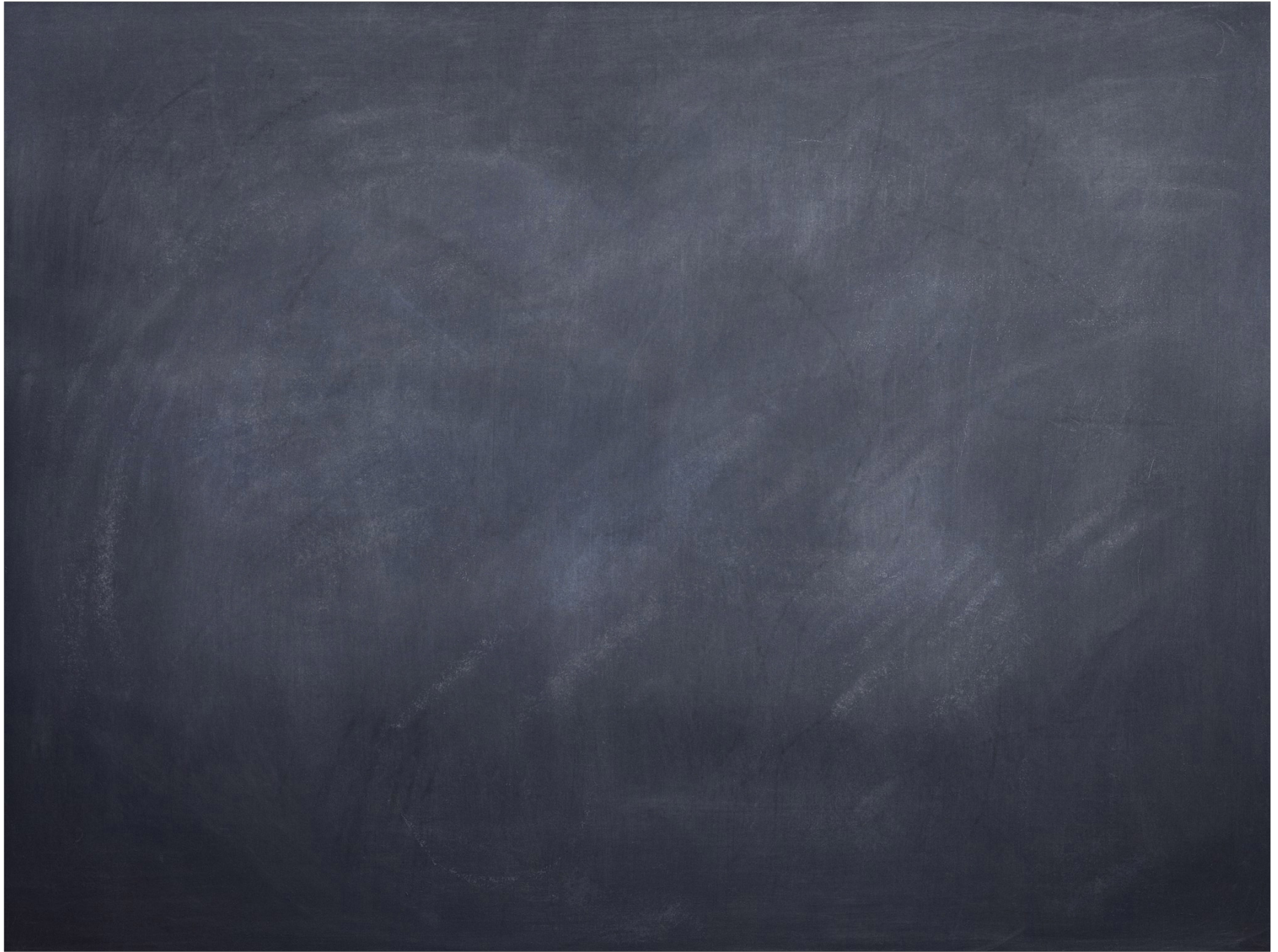
PHY 117 HS2023

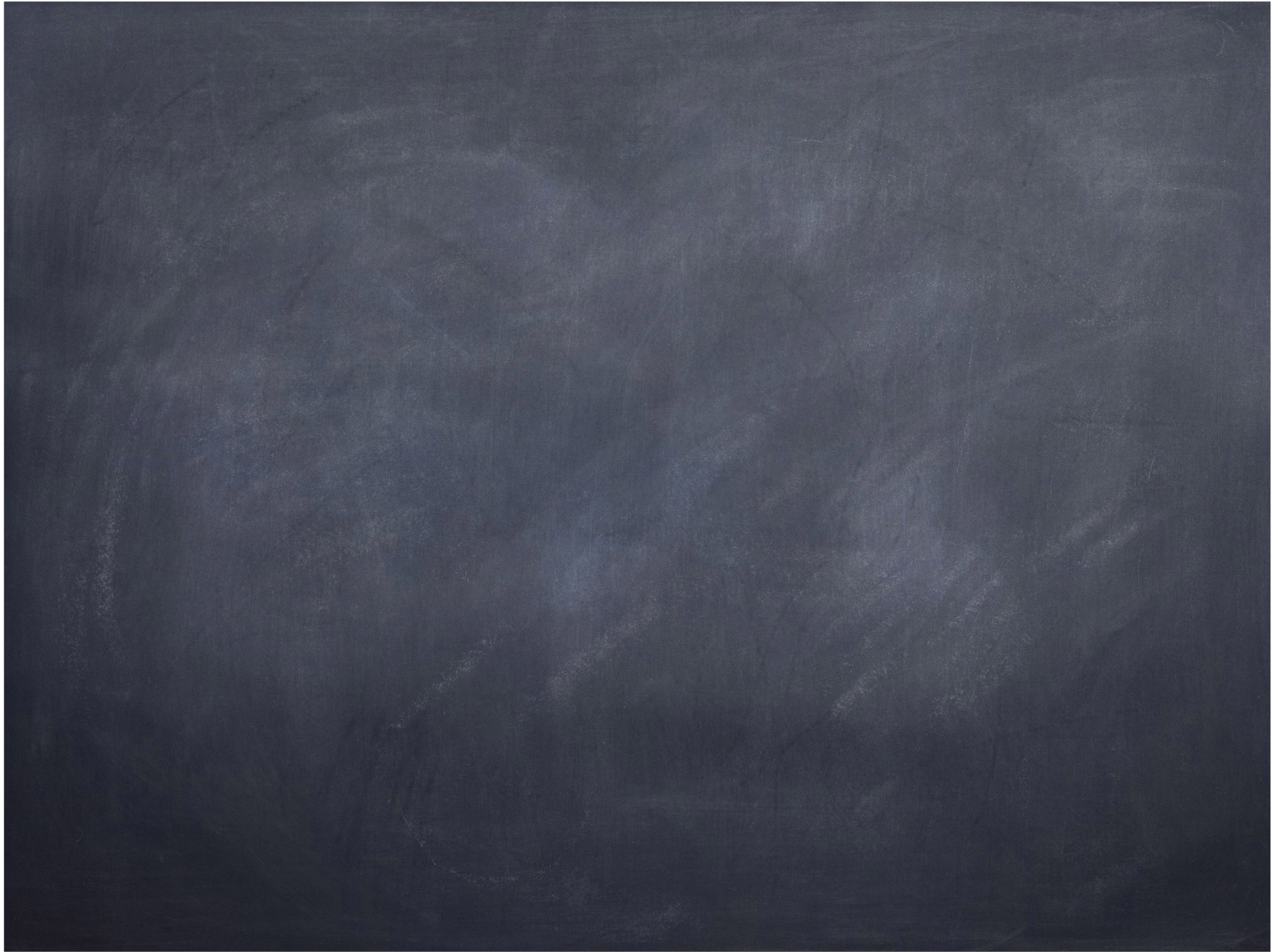
Week 8, Lecture 1

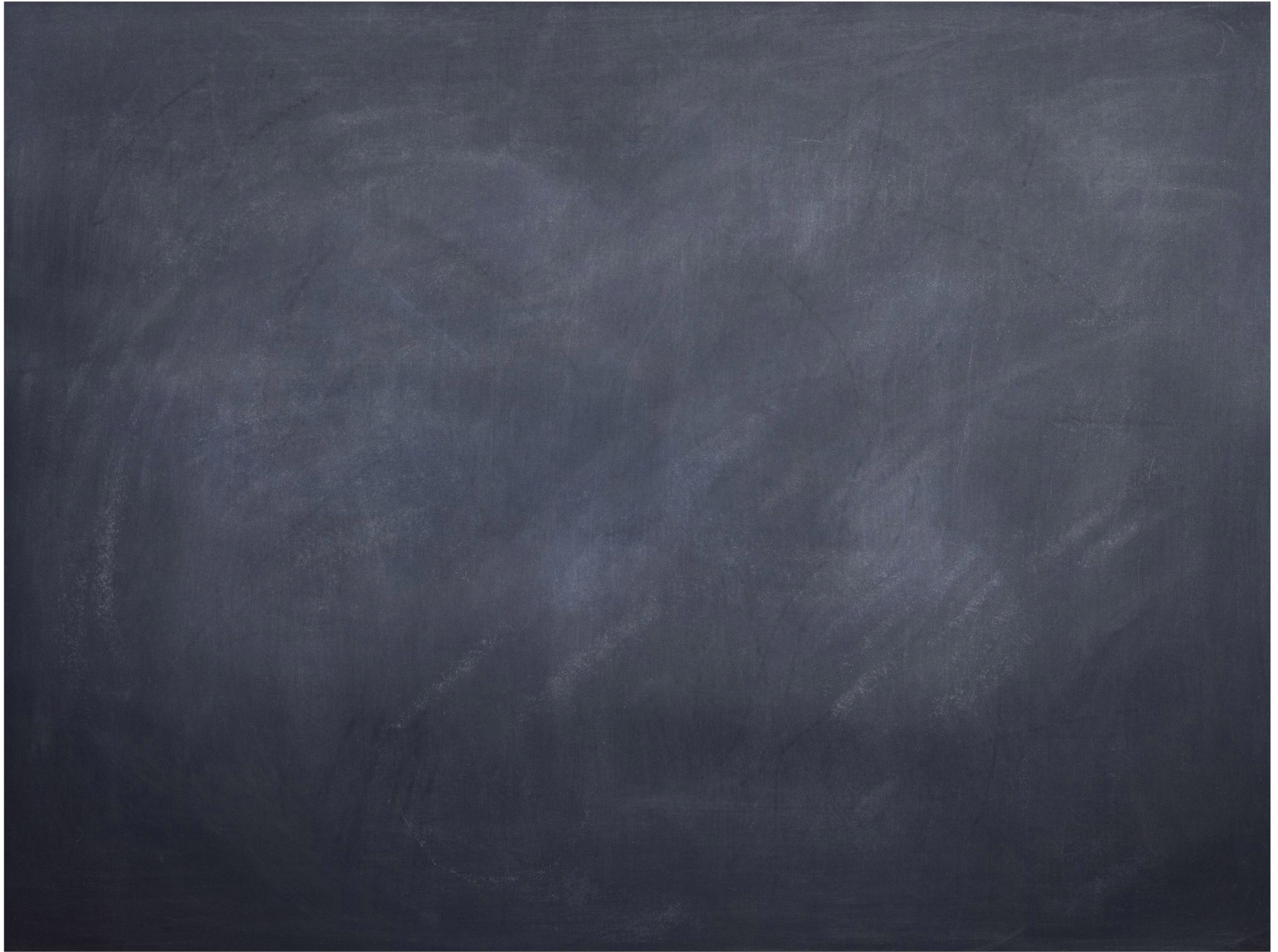
Nov. 7th, 2023

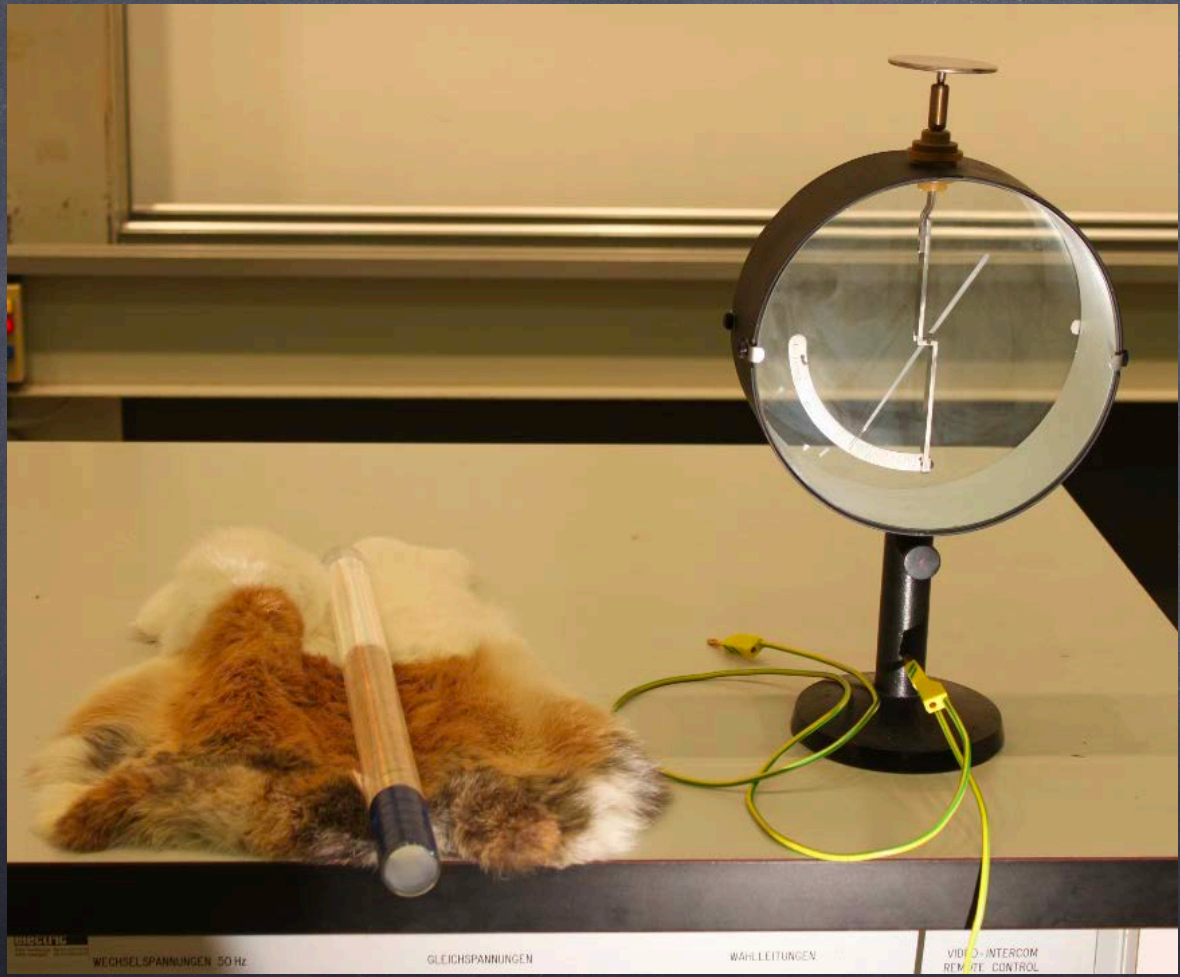
Prof. Ben Kilminster



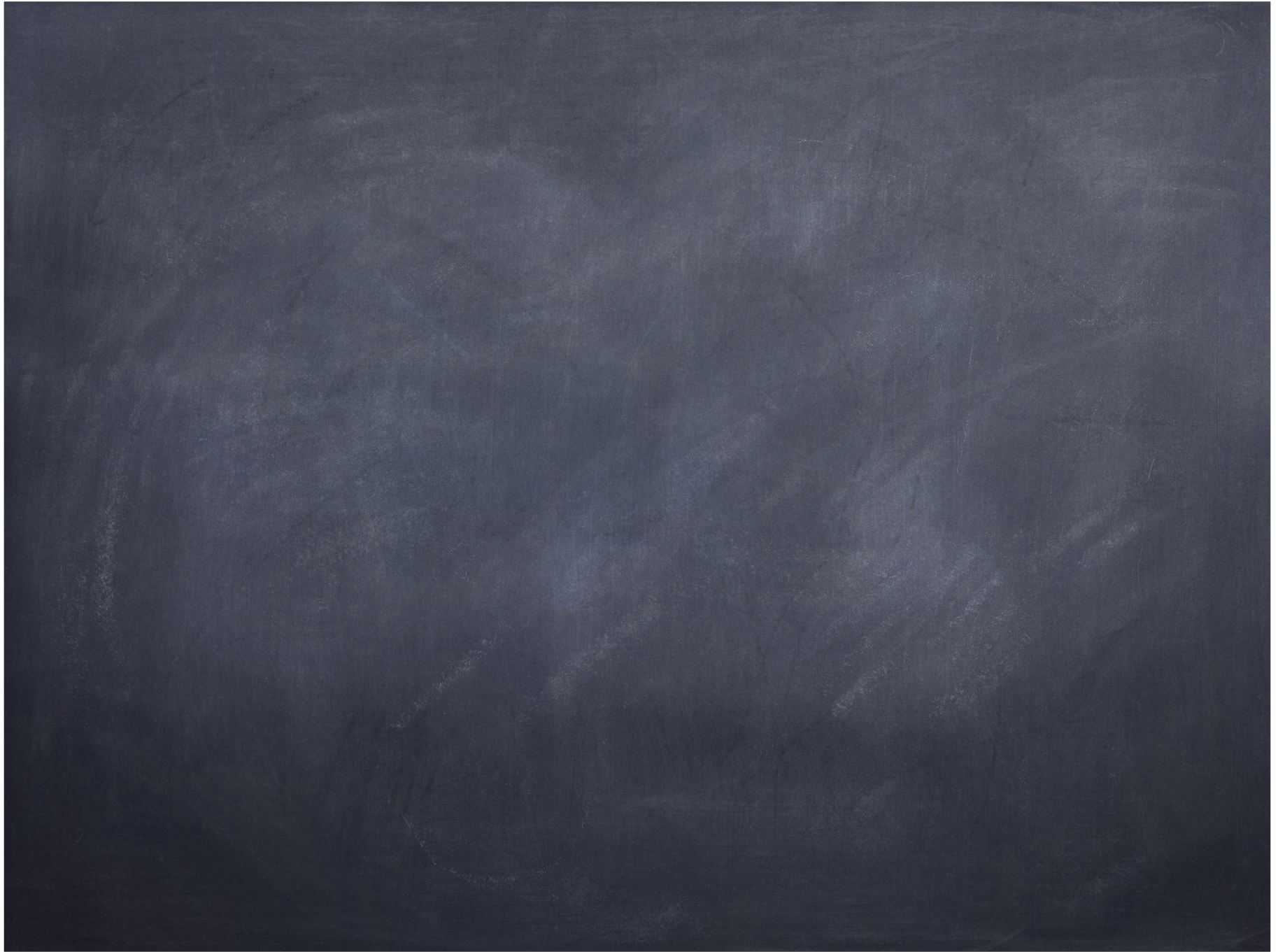








WECHSELSPANNUNGEN, 50 Hz GLEICHSPANNUNGEN WÄRMELEITUNGEN VIDEO-INTERCOM REMOTE CONTROL



Benjamin
Franklin
convention

glass
(both
neutral)



→ rub →



glass is
positive
(red in our
experiments)



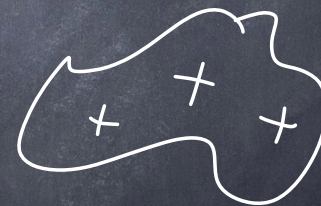
silk
negative

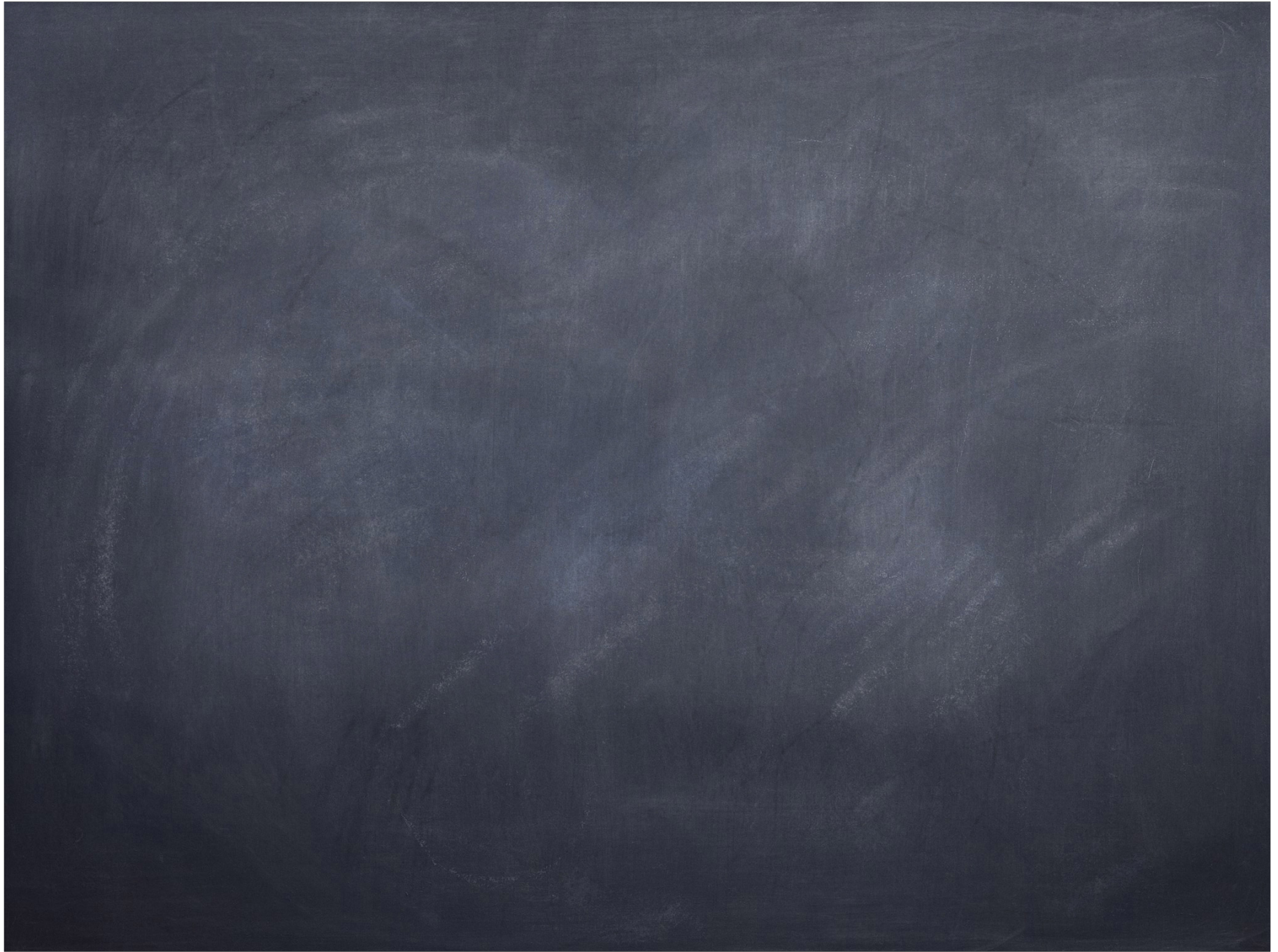
plastic

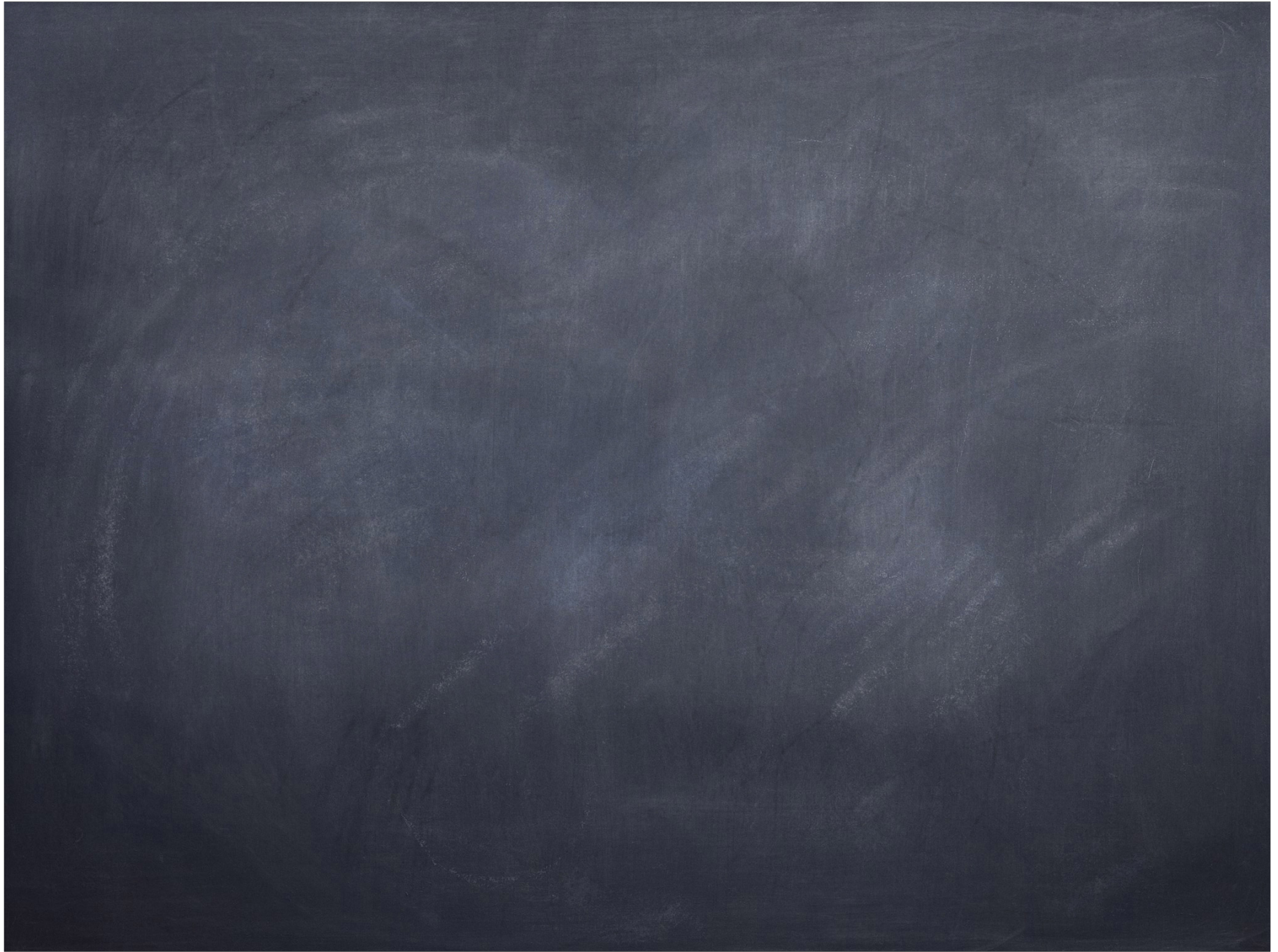
(both
neutral)

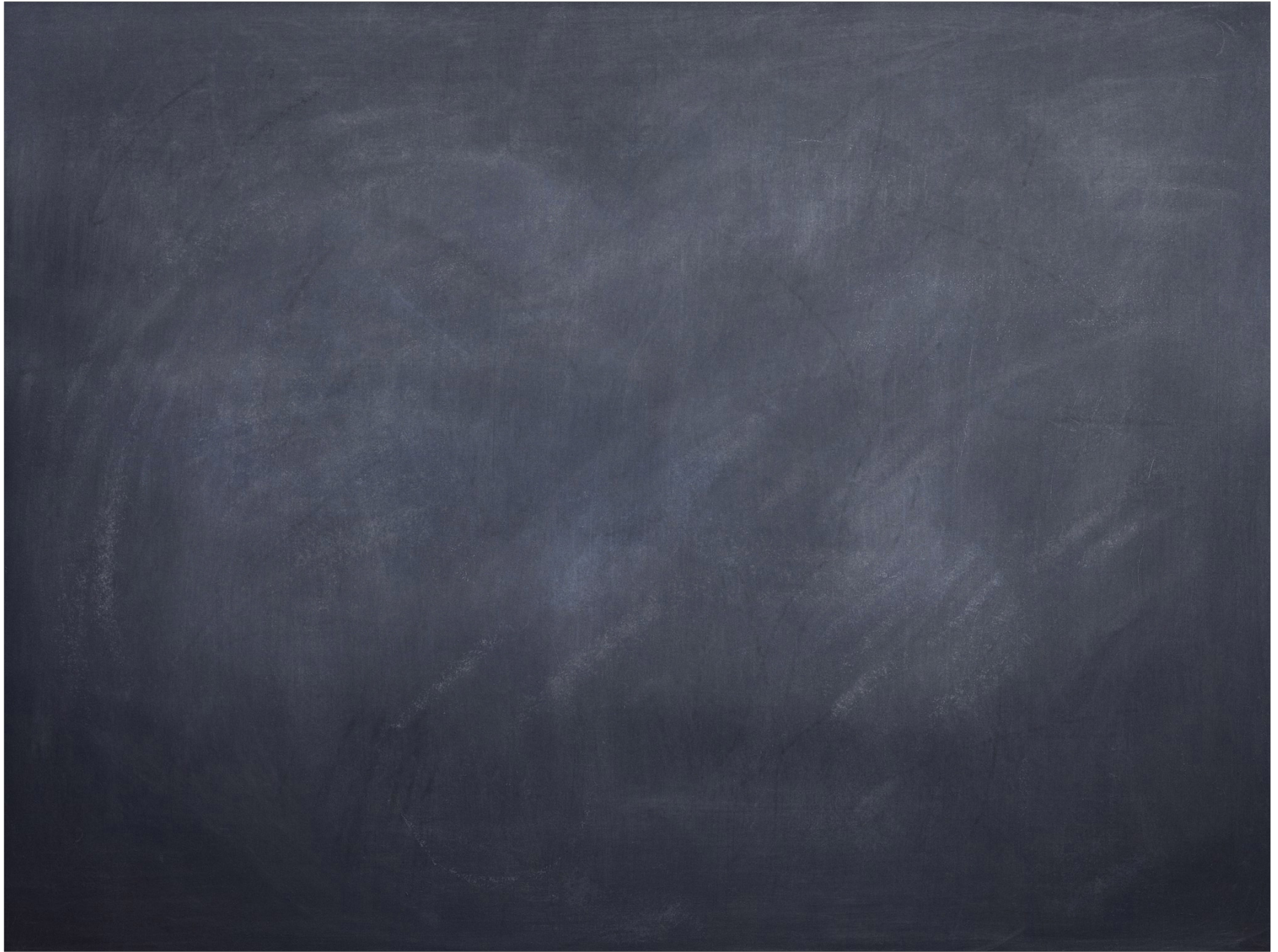


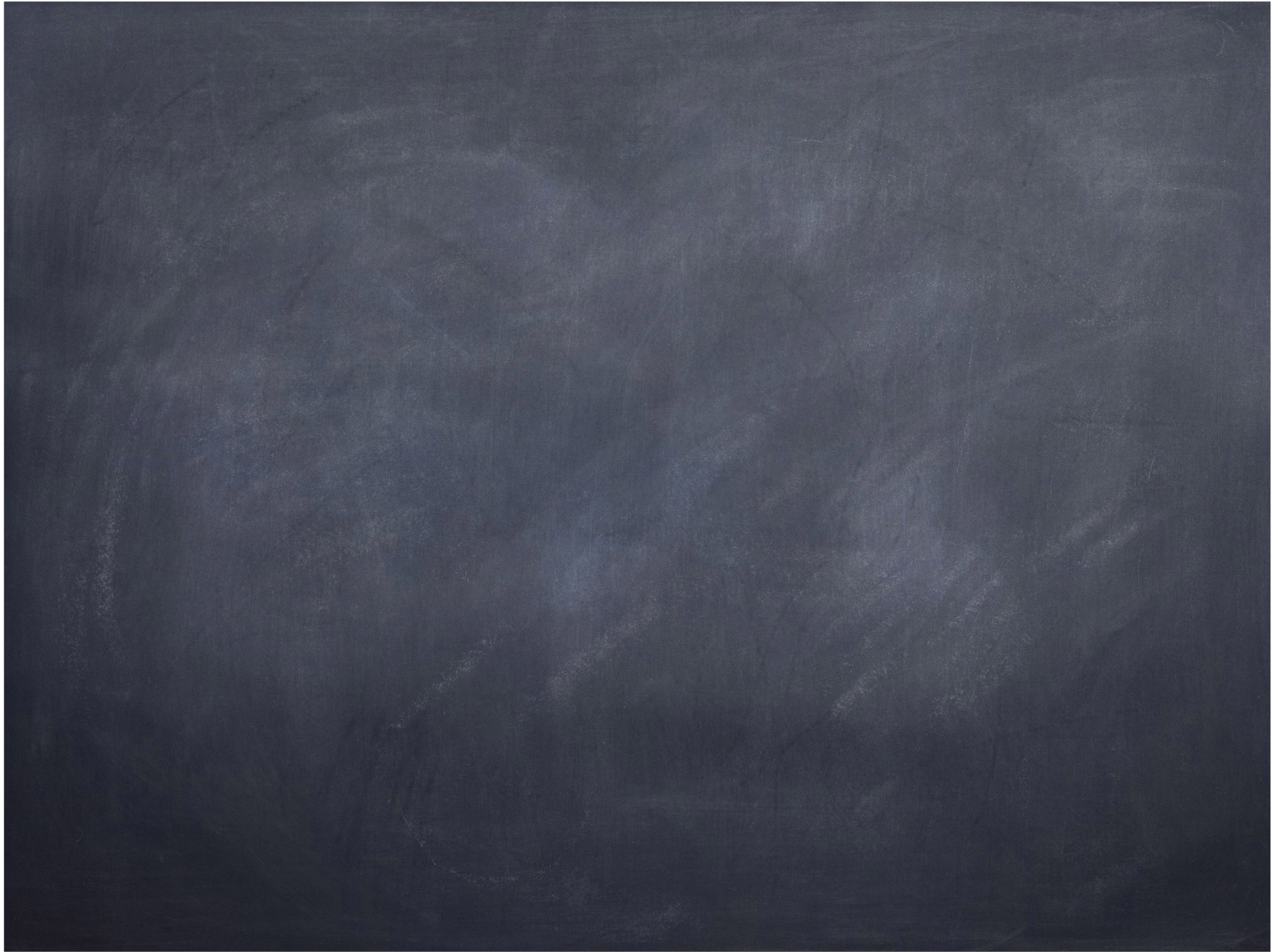
→ rub →

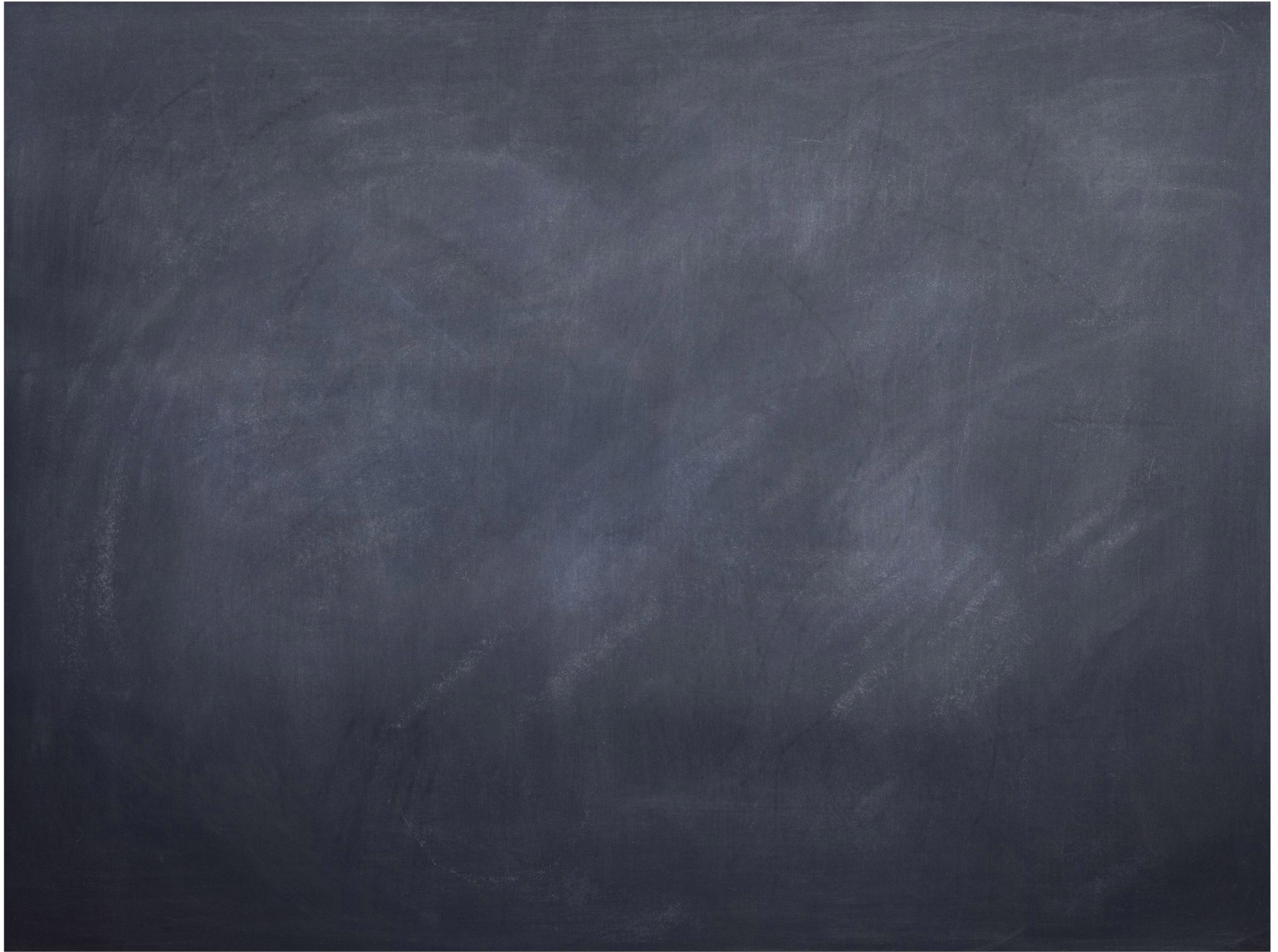




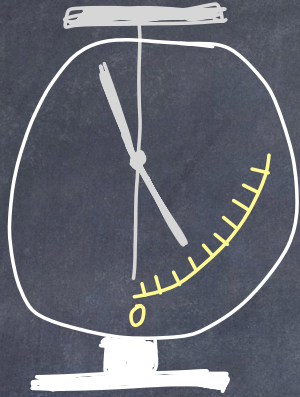






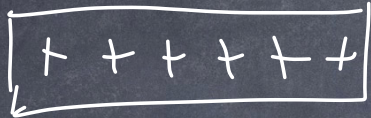


How to measure electric charge:

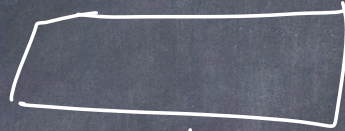


charging by conduction

1)



charged metal rod



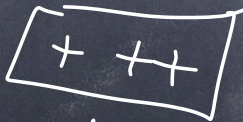
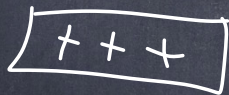
neutral metal rod

2)

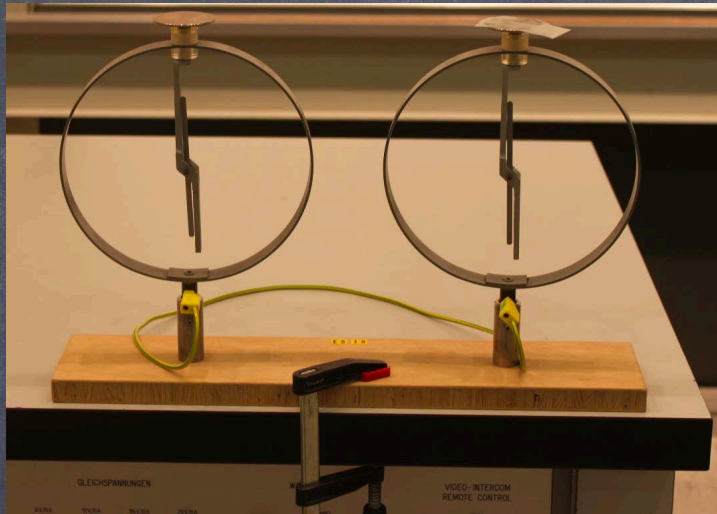


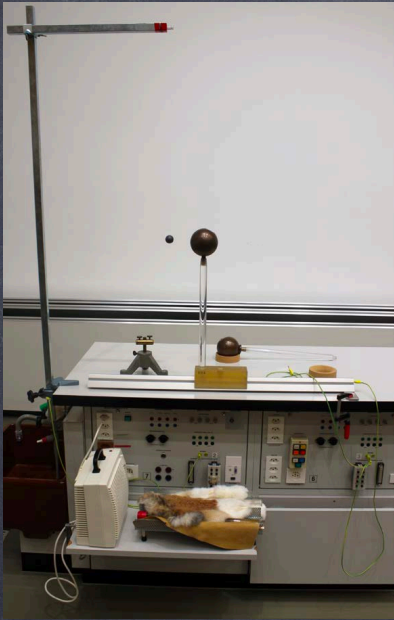
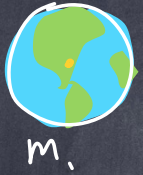
charge transferred by contact

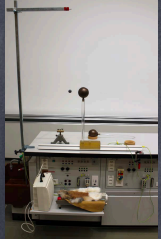
3)

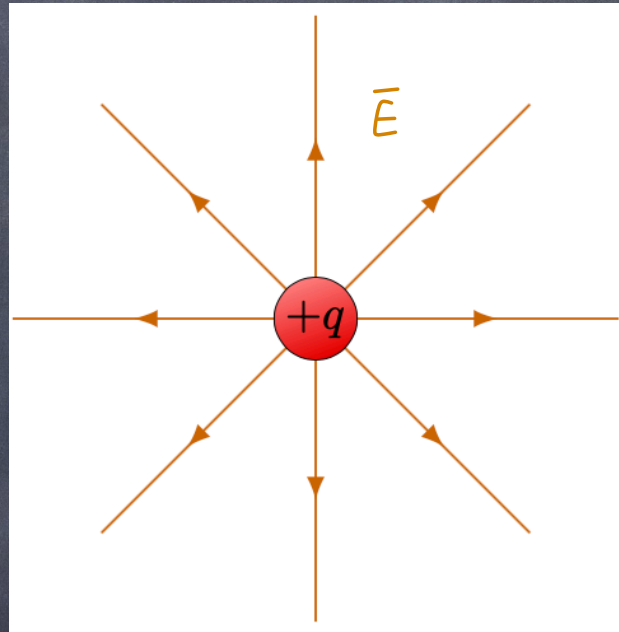


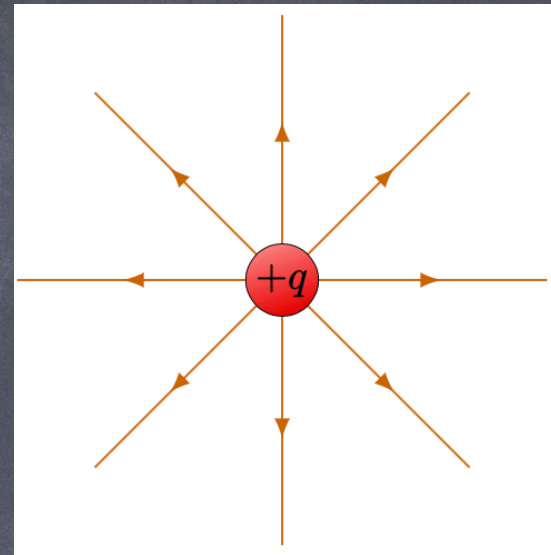
both rods have a charge





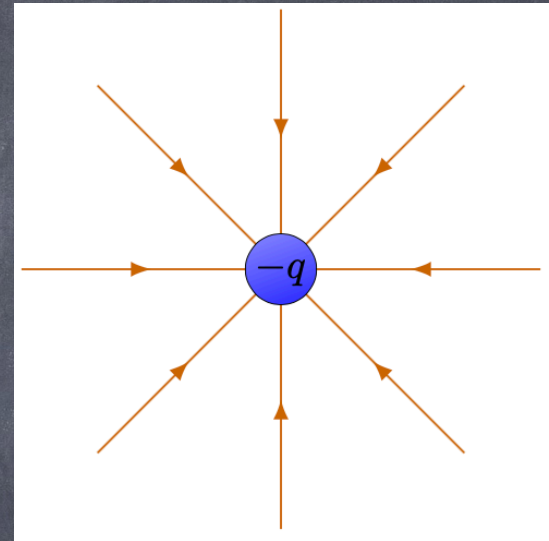






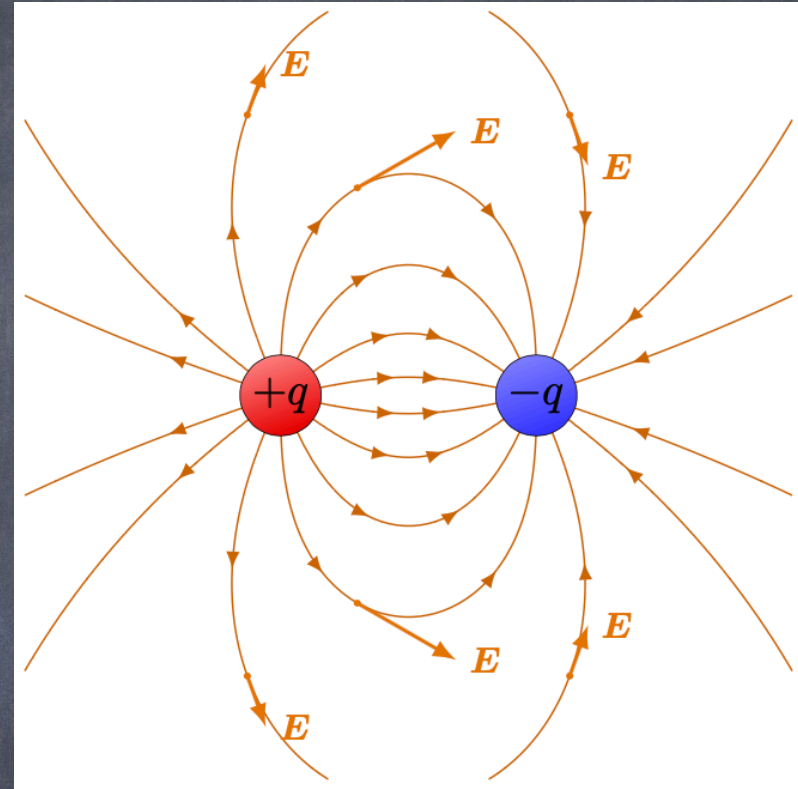
Rules for drawing \leftarrow -field lines:

1) Start on positive charges



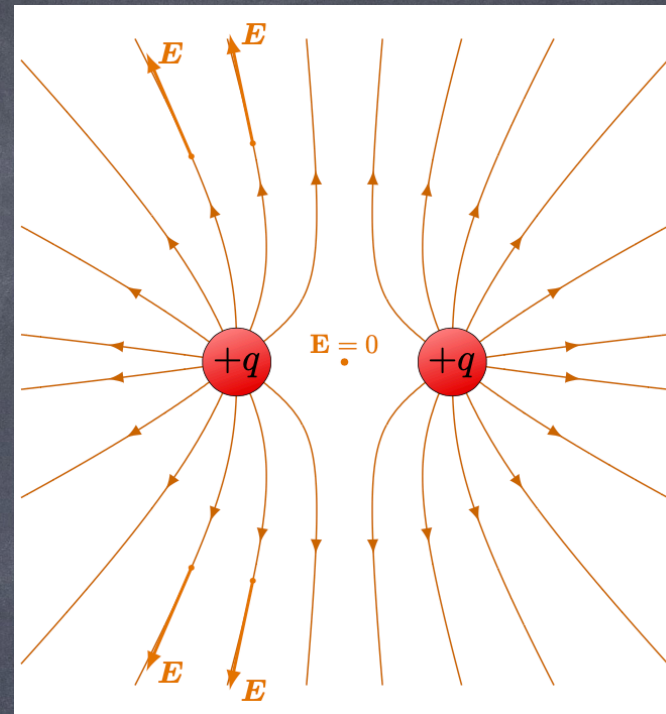
Rules for drawing \vec{E} -field lines:

- 1) Start on positive charges
- 2) End on negative charges



Rules for drawing \vec{E} -field lines:

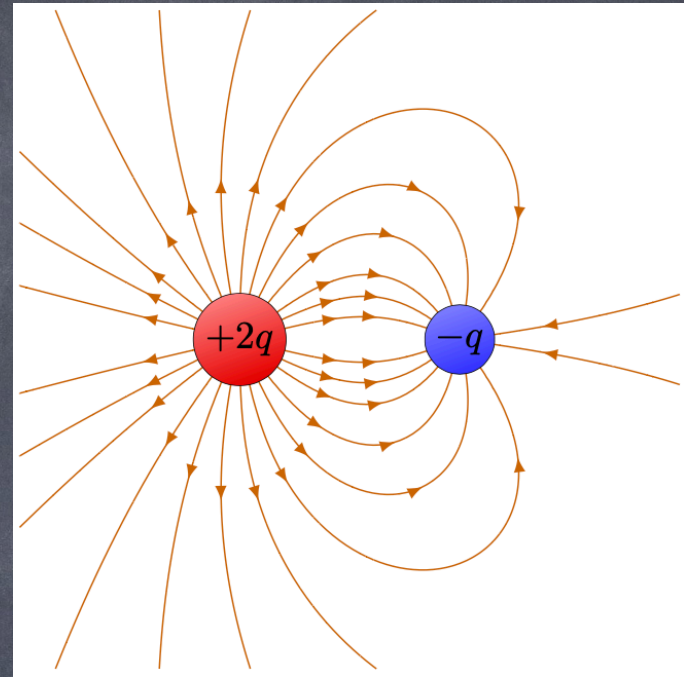
- 1) Start on positive charges
- 2) End on negative charges
- 3) Lines are symmetric as they enter or leave charge



This causes regions
of $\vec{E} = 0$

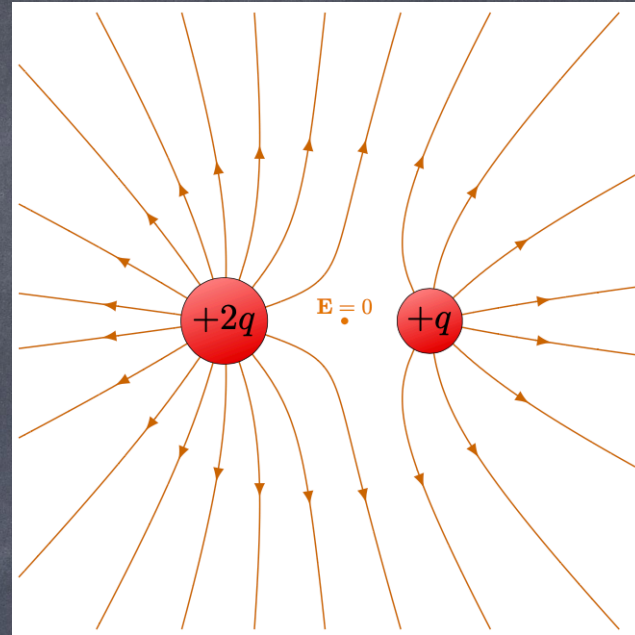
Rules for drawing \leftarrow -field lines:

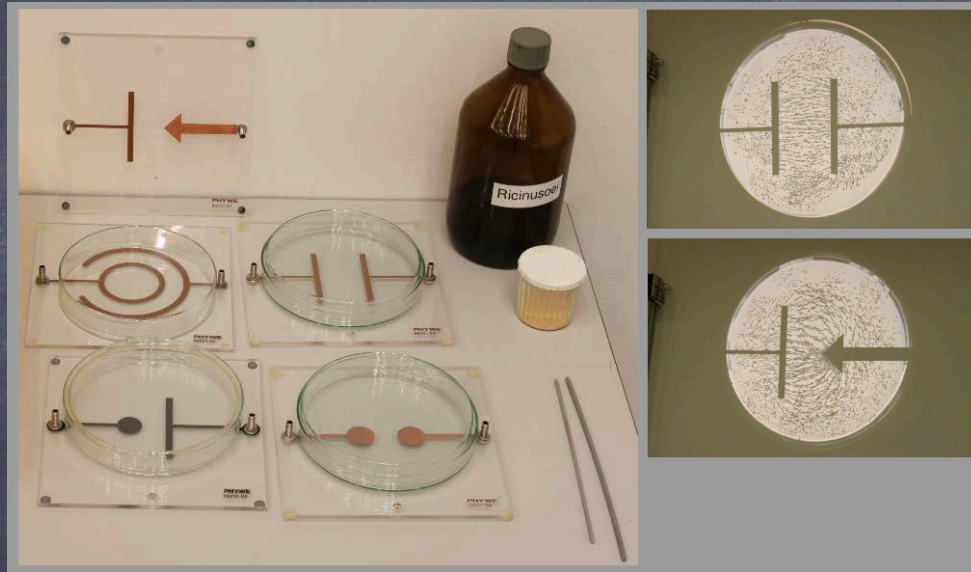
- 1) Start on positive charges
- 2) End on negative charges
- 3) Lines are symmetric as they enter or leave charge
- 4) Lines do not cross

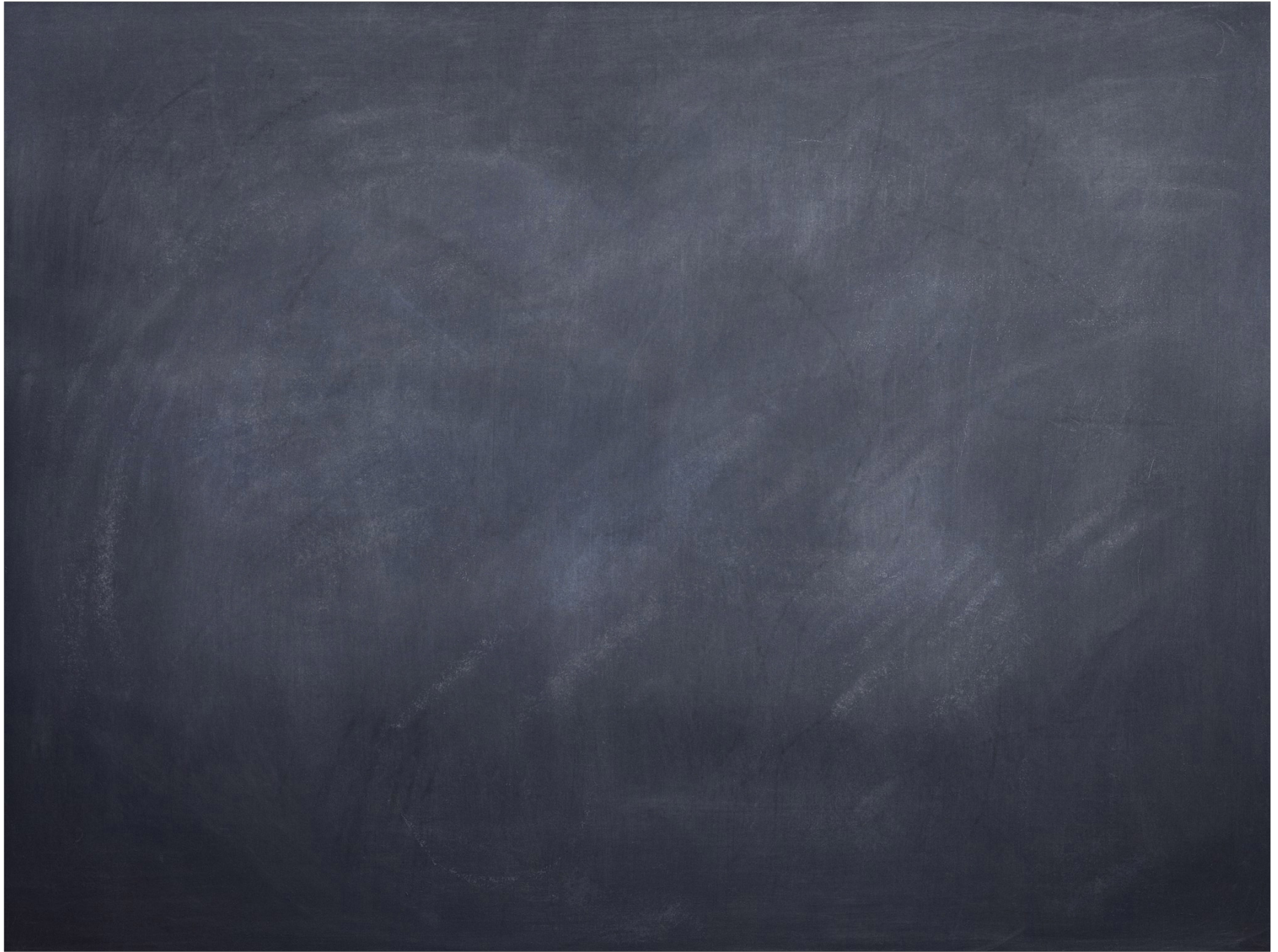


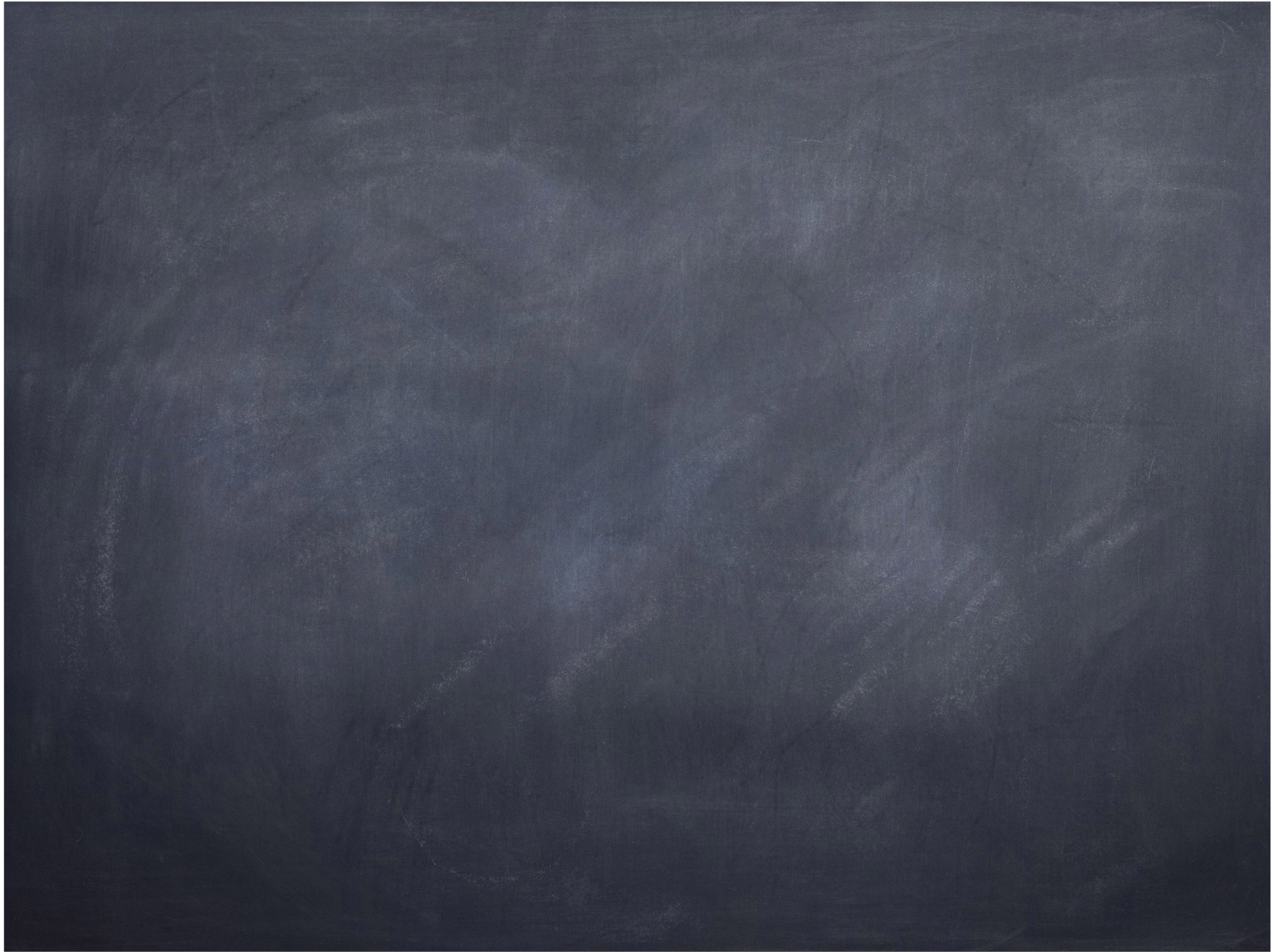
Rules for drawing \vec{E} -field lines:

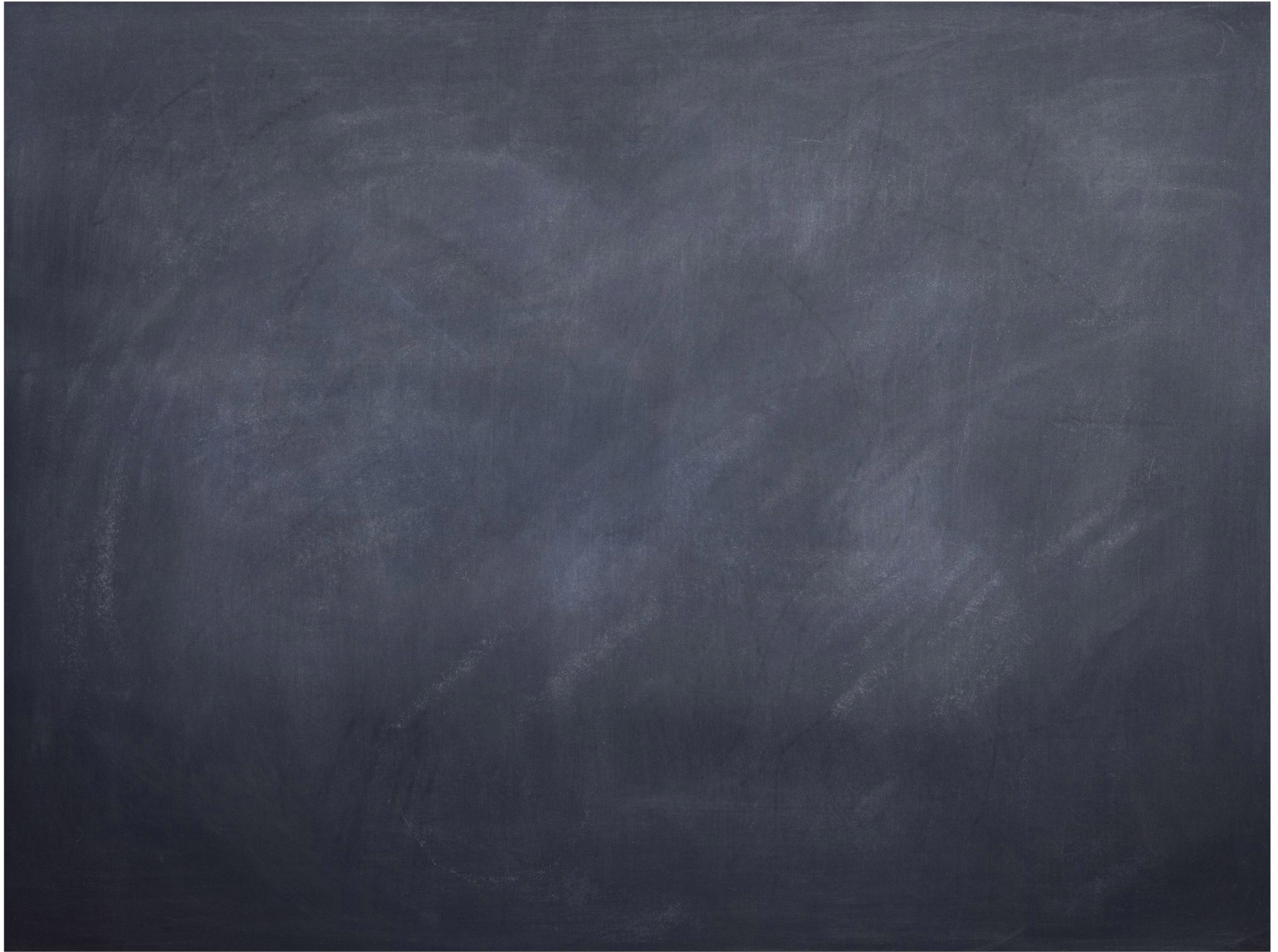
- 1) Start on positive charges
- 2) End on negative charges
- 3) Lines are symmetric as they enter or leave charge
- 4) Lines do not cross
- 5) The number of lines is proportional to the charge.
- 6) The density of lines is proportional to the magnitude of \vec{E}

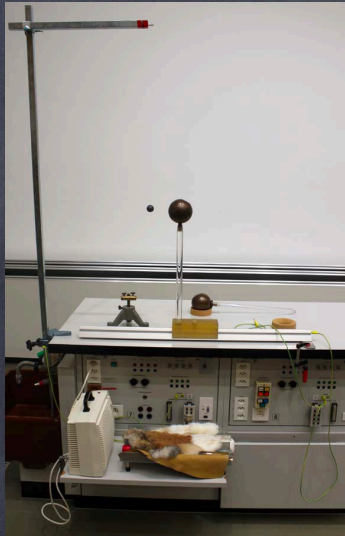




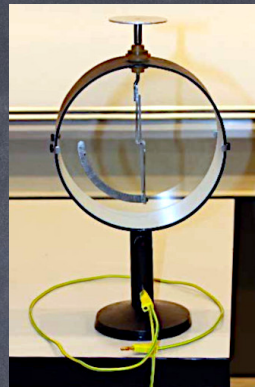




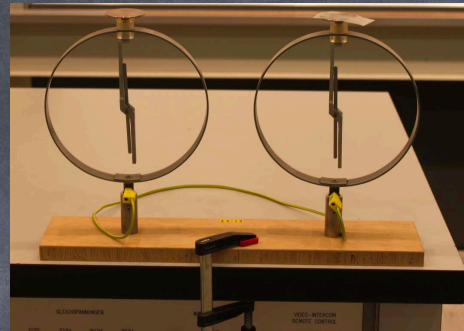




ES2



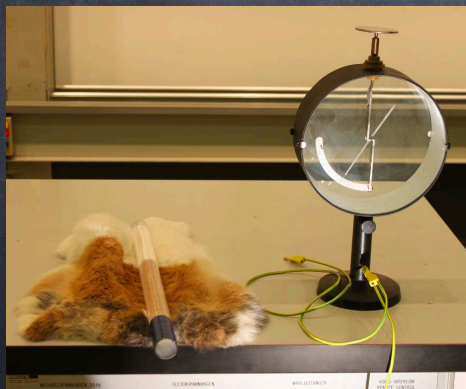
ES8



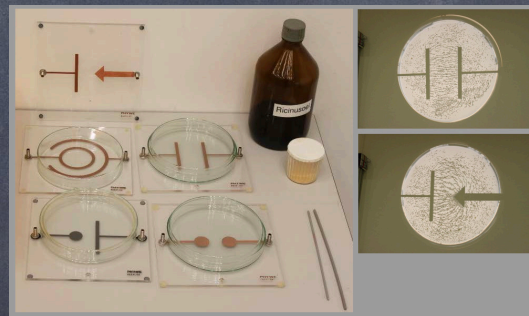
ES19



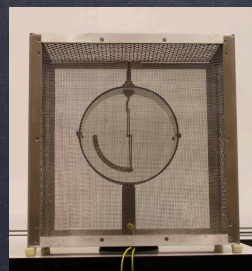
ES20



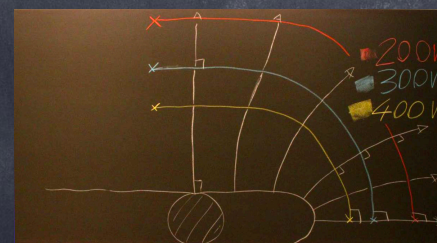
ES24



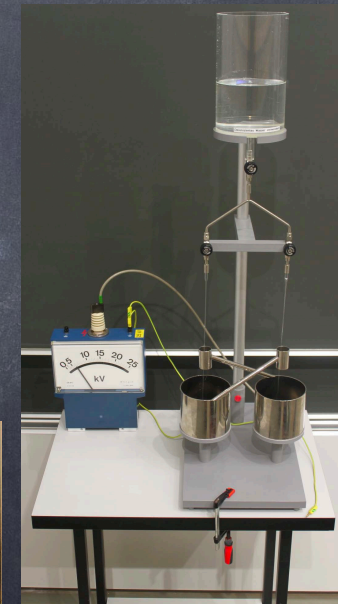
ES40



ES26



ES10



ES25