

# GAS LAWS: HOW PRESSURE AND TEMPERATURE ARE RELATED

APRIL 14, 2024

## BONUS HOMEWORK

*Note: This time the whole homework is bonus, it does not count towards the total number of homeworks solved. Do it if you are interested to derive by yourself where the absolute zero is from actual experimental data.*

1. In class we saw the data for pressure dependence on temperature in a cylinder with gas (which has a fixed volume). At temperature  $t_1 = 58^\circ\text{C}$  pressure was  $p_1 = 114.9$  kPa and at temperature  $t_2 = 51^\circ\text{C}$  pressure was  $p_2 = 112.4$  kPa. Through these two points on a  $p - T$  plane one can draw a straight line. Find at what temperature this straight line goes through the point of zero pressure,  $p = 0$ . You may suspect there is something strange about the point where pressure of the gas become zero. In fact, this is the absolute zero temperature!

*Hint: one way of solving this problem is to determine by how much does the temperature go down for decreasing pressure by 1 kPa.*