

PHYS-468 Exercise 02 – Protein purification

Due date: The exercise is due one week after the lecture on Tuesday before 13:00hrs.

Hand in: Submit the assignment to Moodle as a PDF file with the file name PHYS-468-Exercise-<number>-<name>.pdf, where <number> is a two-digit number (starting with "01"), and <name> is your name.

Name: Last name, First name

Sciper: #####

1) Biophysical properties of proteins:

a) What biophysical properties influence the movement of a protein through solution, and how?

b) How do amino acids determine the a different biophysical properties of a protein?

2) Chromatography columns used in biochemistry:

- a) According to which property does a gel filtration column separate proteins?
- b) According to which property does an ion exchange column separate proteins?
- c) How can an IMAC column be used to purify one protein out of many?

3) Gel electrophoresis

- a) Explain/Draw + label the mechanism of SDS-PAGE
- b) You run an SDS-PAGE gel and see multiple bands for your purified protein. What are possible explanations? How would you refine the purification?

4) Spectroscopy Calculation

A protein solution has an **absorbance (A₂₈₀) of 1.5** in a **1 cm cuvette**. The extinction coefficient for this protein is **50,000 M⁻¹cm⁻¹**. What is the protein concentration?

Hint: Use Beer-Lambert Law: $A = \epsilon cl$.

5) Membrane proteins

Explain/Draw + label how detergents can be used to aid in the purification of membrane proteins?