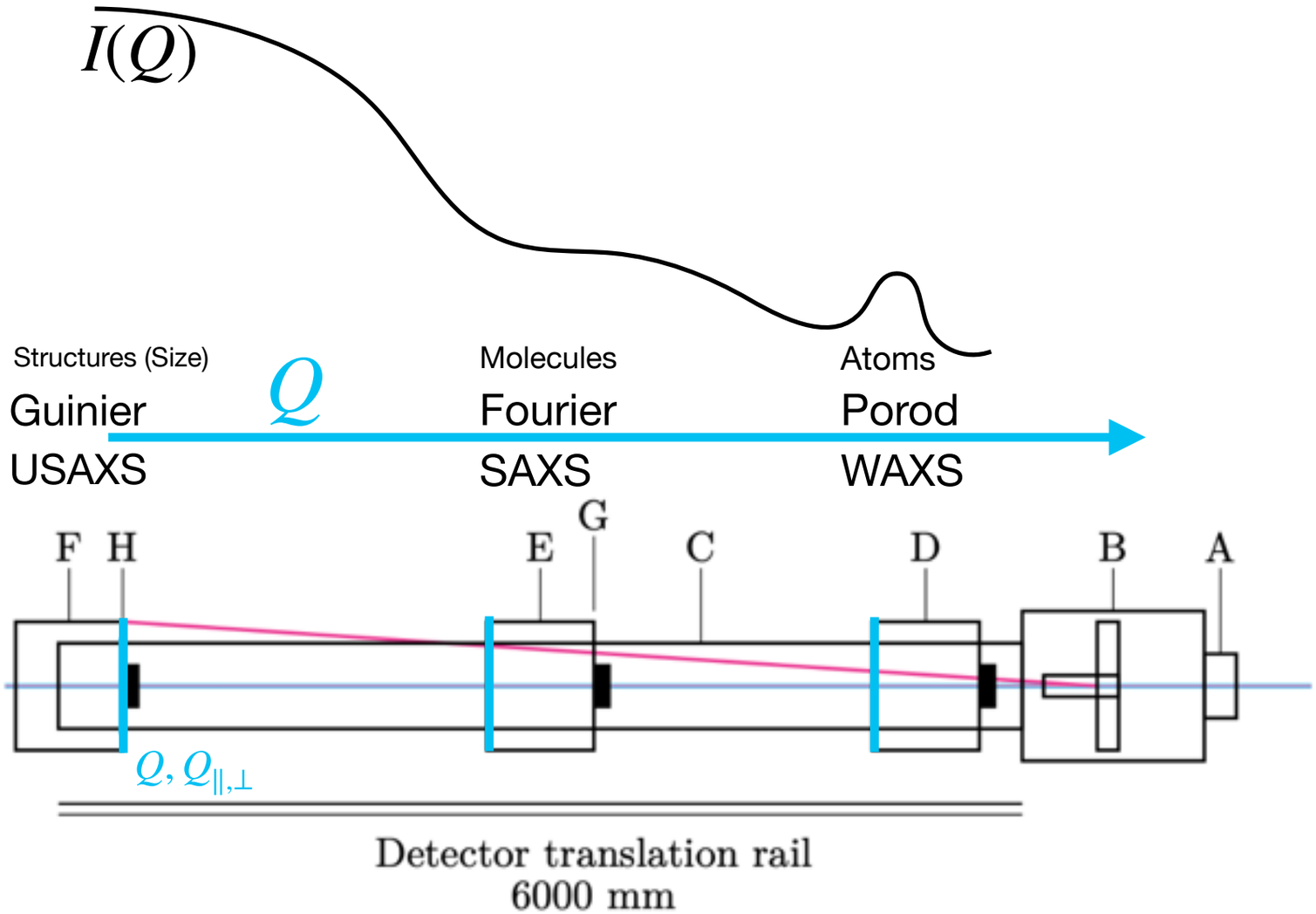
SAXS — Measures Information

Introduction

A — Collimators, B — Sample chamber (two sample positions (GISAXS, SAXS), C — 6 m vacuum flight tube, D — WAXS detector (with beamstop), E — SAXS detector (with beamstop), F — USAXS detector (with beamstop), G — PSL (primary scattering line), H — Q-vector (scattering direction marker)



Constraints & Information Space

SAXS measures an averaged transform of real-space distances:

$I(q)$ is purely *experimental space*, Information is determined by the finite q-range, noise, beamstop, resolution (Information space). The spatial averaging makes $p(r)$ a stable distance descriptor.

Experimental space: the measured $I(q)$.

Information space: what survives sampling, noise, and normalisation, background subtraction.

Model space: structural hypotheses consistent with the available information, $p(r)$.

Proper normalisation respects Shannon sampling, positivity of $p(r)$ (where appropriate), and avoids hidden priors.

The goal is to make the **information content** of $I(q)$ explicit *before* any structural interpretation.