



Chemical & Physical Sciences

UNIVERSITY OF TORONTO

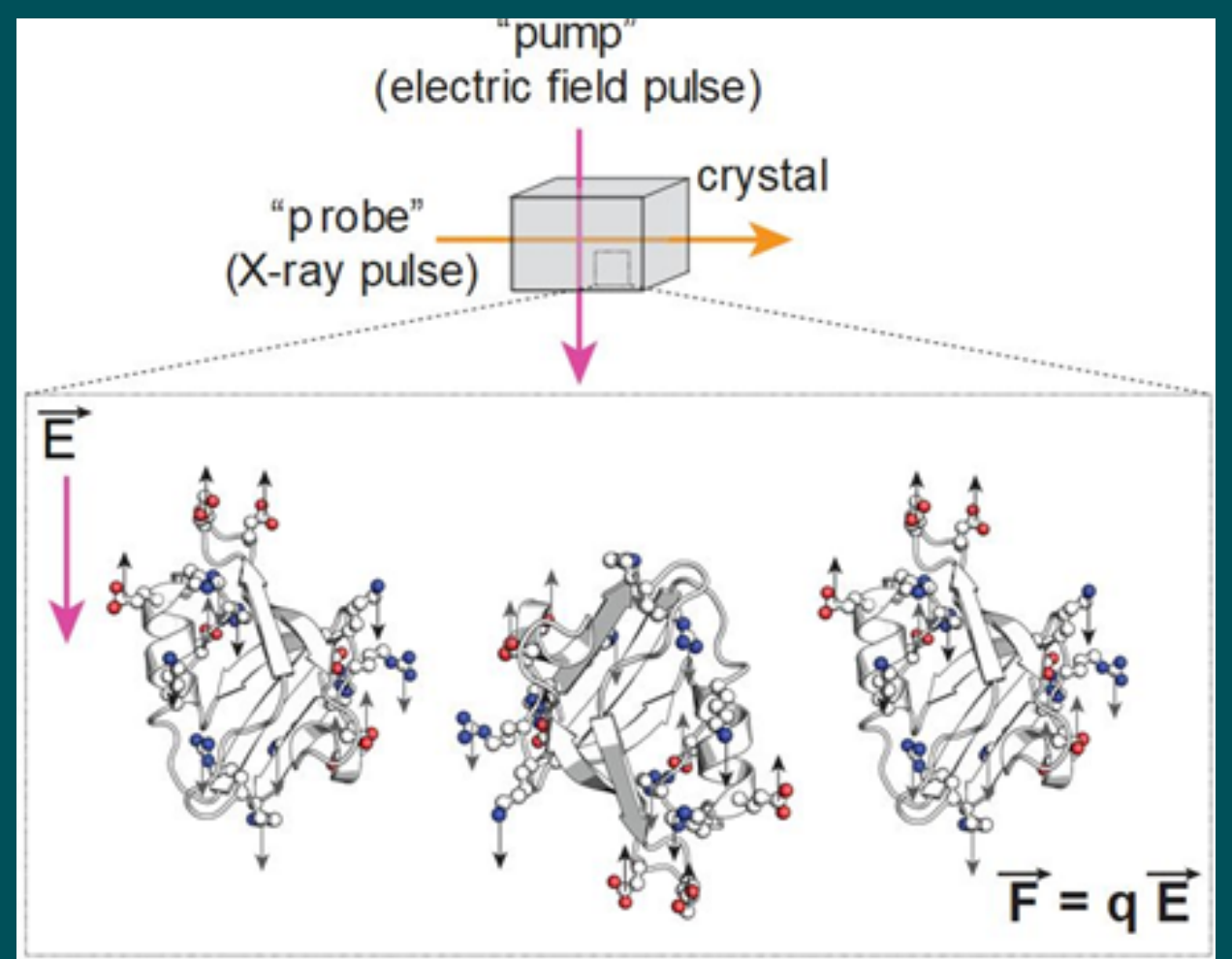
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## COLLOQUIUM SEMINAR SERIES

### TOPIC: TOWARDS DIRECT VISUALIZATION OF THE REACTION COORDINATES OF PROTEINS



**Speaker: Professor Doeke Hekstra,**  
Department of Molecular and  
Cellular Biology, Harvard University



As for man-made machines, the functional cycles of enzymes and other proteins involve the coordinated motion of their parts. These motions, and the mechanical properties of proteins more generally, are therefore an important link between protein structure, function, and evolution. For most proteins, experimental access to protein mechanics has remained elusive.

I will describe our efforts to directly push and pull on protein molecules using electric fields, and to observe the resulting motion in atomic detail using time-resolved X-ray diffraction. To illustrate the potential of the approach, I will discuss new results on the direct visualization of  $K^+$  ion permeation through an ion channel, and the dissection of intermediates in the reduction of substrate by the enzyme dihydrofolate reductase.

**Colloquium Seminar Series**

**Wednesday, September 8, 2021**

Join us on Zoom at 3:10pm

<https://utoronto.zoom.us/j/84409166490>