# 第１４４回化学コロキウム／（大学院GP・物理-化学合同セミナー）

日時、教室　６月２３日（火）15:00-16:00　　8-304号室

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演題　*Ion Transmission through Insulating Capillaries*

Multiply charged ion beam transmission through insulating capillaries is today a very active field of research. Thanks to the work of several groups during the last five years, several features of this unexpected process have been evidenced. The open challenge is to understand and control the self-organized charging-up of the capillary walls which leads finally to the ion transmission. Up to now, the specific charge distribution on the inner surface, as well as the dynamics of the build-up, are still to be understood.

While capillaries usually studied are microscopic pore networks etched in different materials, our concern is in macroscopic single capillaries made of glass. With a length of several centimeters and a diameter of a few micrometers at the exit, these capillaries have nevertheless the same aspect ratio as the etched pores (length/diameter ≈ 100). One of the leading goals of this research on single capillaries is to produce multi-charged ion beams with diameters smaller than a micrometer (nano-beams). Collimation by diaphragms is generally used to achieve this scale, but at the price of a drastic ion flow reduction. These glass capillaries offer the opportunity to use them as an ion funnel due to their amazing properties of guiding and focusing highly charged ion beams without altering neither their initial charge state nor the beam emittance ($< 10^{-3}$mm.mrad). However, the understanding of the underlying process is not complete and relies on models assuming charge patches distributed along the capillary and which still need to be tested. Our latest observations concerning the dynamics of the charging-up process show that the 230keV $Xe^{23+}$ transmitted beam is deflected back and forth several times as the outgoing current increases in agreement with the picture of charge patches created sequentially along the capillary and thus deflecting the beam.

連絡先　分子物質化学専攻　城丸（３４４７）