Greetings from Innsbruck. We leave here for Athens on Sunday, February 14. Yesterday we went to the Cafe Sacher, an elegant restaurant in the heart of the old city of Innsbruck. Barb was filled with anticipation with her raspberry soft drink as shown on the next page. Cafe Sacher, to quote its website, has the following description:

The elegant and iconic Café Sacher in Innsbruck is in the Hofburg Imperial Palace and it exudes old world Habsburg atmosphere with modern touches brought in with a 2011 refurbishment. The café is a successful combination of a wine bar, restaurant & café. It offers the opportunity to sample some of the original Sacher Torte but there are also many savoury dishes and a fabulous wine list. In the summer the quiet interior courtyard of the palace is a great venue for sampling some of our extensive selection of cocktails and liqueurs.

We most certainly “sampled” some of the torte, a chocolate delight. We had this after we ate some veal and chicken schnitzel.

I will have given three talks by the time I leave here. Tomorrow should be a highlight with the making of a pressurized borate crystal. The advantage here is that making crystal analogues of Coe studied glasses gives an alternative way for understanding structures and, additionally, this gives the possibility of creating novel environments by making the crystals under high pressure. Some of the possibilities include observing three-coordinate oxygens, tetrahedral borons that bond to each other by sharing edges, and totally new so-called superstructural groups that we study by 10B nuclear magnetic resonance. I will report tomorrow on the making of such a crystal. The high pressure they can routinely exert is the key experimental advantage to this lab.

The night before last we attended a folk music and cultural show produced by a local family, the Gundolfs. It was great. Here are a few pictures from the event.
At Cafe Sacher in Innsbruck
Playing a song on a saw!
Playing bells

In Greece I'll be giving the talk shown on the next pages. Can you read the Greek? Here is a sample: Αθήνα is Athens.
“Glass forming limits: A simple model based on short-range structural units”

Professor Steve Feller

Physics Department, Coe College
Cedar Rapids, Iowa, USA

Πέμπτη 25 Φεβρουαρίου 2016, ώρα 12:00

Αίθουσα σεμιναρίων στο ισόγειο του ΕΙΕ
I will be giving this talk at the National Hellenic Research Foundation in Athens, whose physical chemistry institute is led by long term colleague Dr. Stratos Kamitsos. Further details can be found at http://www.eie.gr/nhrf/institutes/tpci/index-en.html My first sabbatical trip to Europe was in 1990 and it was to this place.

Thursday, February 11, 2016.
Walking in to the institute here I snapped a few pictures, here are two samples:

Outside our apartment
The Institute I worked at: A part of the University of Innsbruck

Today’s agenda includes being part of an experiment to make high pressure crystals. This is the key experimental reason for my visit. The following pictures show the process of doing the experiment (abbreviated!). The experiment took two days. Day one was sample preparation and start of the pressurization. Day two was sample retrieval and characterization.
Pieces that surround the sample cell. These help transmit the high pressure.
The Pressure set up partially put together.
Part of an 8 piece cell that holds the sample. This fits into the assembly from the page before.
These are used to enclose the sample
The sample is in concentric cylinders. It is below the white incer cover you see at the end.
Sample is placed at the center of this set of eight cubes
The big cube of 8 cubes is placed in the pressure press. The copper is used to transmit current and hence heat the sample up to 1500 °C.
Here is the press put together. The sample is in the middle of the bottom cylinder. The pipes allow flowing water to cool key parts of the press while the sample is hot.
The pressure setup capable of going above 10 Gpa. Note the water hoses now attached. Tomorrow I will see the crystal.

After a few hours of discussion with the head of the institute, Prof. Hubert Huppertz he showed me some liquid cesium he had synthesized. He then melted it in his hands! I have a great video of this to use at Coe.
Cesium that liquified in Hubert's hand.
Dr. Huppertz with his liquid cesium
We went to the old town last night and heard music in the square from the opening of the World Bob-sleigh and Skeleton Championships.

In that area I found a great numismatist and I spoke to him for over an hour. I ended buying a few things including a Maxmillian the first silver coin dated 1514 in Roman numerals and a 1976 silver Austrian coin that celebrate the Olympics held that year in Innsbruck. The coin had a row of old town buildings including the very one I was in while making the purchase.
Row of buildings that appear on Austrian Olympic coin from 1976, see next slide
What a place to buy a coin!

Here is another scene of the Old Town of Innsbruck:
Friday, February 12

The experiment on the molybdenate borate crystal is finished and being analyzed at this moment, first by visual microscopy then by X-ray diffraction. Here are images of the retrieval process for the samples.

The octahedron that holds the sample after the pressure experiment (left). It is next to a new one. Note the compression and the sample in the middle. The sample is tiny and is smaller than a pencil eraser.
Martin Schmitt is hammering the octahedron to retrieve the sample cylinder
Martin did a fine job with the hammer! Next, the sample was picked out of the pieces of the cylinder.
The whitish material in the middle of the sample vial pieces is the crystal. This is enough to do the X-ray experiment.
Magnified image of the sample. Note the small bits of red material; this is likely the desired compound.

Next the X-ray sample was prepared. This sample was then placed in the spectrometer for a diffraction pattern. The sample rotated during the experiment to ensure homogeneity in the powder pattern.
X-ray sample read for a washer to secure it.
X-ray diffractometer
The resulting X-ray powder pattern. Only a smidgeon of sample was used.

My next report will feature Athens and vibrational spectroscopy. See you from Greece. I go there this weekend.