CH-314 Structural Analysis
ruben.rodriguezmadrid@epfl.ch
ray.cowen@epfl.ch

Jigsaw 5A

1. [Week 4 Slides 38-41] Two useful parameters in static solid-state NMR are the span, Ω, and skew, κ.

    a. What do Ω and κ represent? I.e., what information do they tell you about the molecule?

    b. How can we determine Ω and κ from a static spectrum?

    c. For the specified nucleus of each of the following molecules, predict the values of Ω and κ and draw the expected powder pattern. For Ω, you do not need to give a precise value, just a qualitative estimate (small, moderate, large). Assume the samples are all in a solid powder and measured in static conditions.

        i. The ^{13}C in chloroform

        ii. The ^{29}Si in tetramethylsilane

        iii. The 3,4 protons in furan

2. Solid-state NMR can be useful to determine if a sample is amorphous or crystalline. Imagine you need to buy lactose for your experiments, but you need it to be crystalline. A laboratory offers two types of lactose: spray-dried and in tablets, the spectra of which you can see below. Which of these two is appropriate for your experiments and why?