Q: What are the main disadvantages when simulating magnetohydrodynamic flow, even at low magnetic Reynolds conditions?
A: A comprehensive solver can suffer from high computational cost if it needs to couple momentum and magnetic field equations (and it is even worse if the solver accounts for buoyance). Also, the steep gradients in the boundary layers force the user to do fine meshing, also contributing to higher simulation time.

Q: What are the advantages of the Q2DmhdFoam solver versus other magnetohydrodynamic simulation tools?
A: It is very fast and still representative of some situations such as the evolution of the side boundary layer, even with buoyancy forces. Also, produces results that can serve as a starting point for the convergence of more rigorous calculations.

Q: What are the disadvantages of the Q2DmhdFoam?
A: It is a simplification, therefore more prone to errors and restrictions of use. For example, the Hartmann boundary layers cannot be studied with it, since it can only represent the two-dimensional behavior in planes perpendicular to the magnetic field.

Q: How can you take advantage of scripting for running several FOAM cases sequentially?
A: Programming languages such as Python rely on libraries that can do a variety of tasks useful for file management automation: call Unix commands, read and replace text, optimization. With a *for* loop and some intermediate calculations, one can run and compare several cases with just a call to a script.