

# Mathematica

We have computing licenses for Mathematica available within the theory group.  
Desktops and machines in the SLAC network can use our license server.  
A limited amount of individual licenses is available for computers / laptops outside the SLAC network.

Alex ([alexfr@slac.stanford.edu](mailto:alexfr@slac.stanford.edu)) is maintaining our Mathematica licenses.

## Software

Mathematica for Windows, Linux and MacOS can be downloaded from our [theory machines](#) and is located at

```
/u2/mathematica_files/
```

## License Server

If you are activating Mathematica via a GUI, select network activation and choose

```
epp-theory02.slac.stanford.edu
```

as the license server.

For this to work, you need to be inside the SLAC network and can only use Mathematica as long as you stay in the network as the license server is not reachable from the outside.

If you activate Mathematica from command line add the following line to the file ".Mathematica/Licensing/mathpass" in your home directory.

```
!epp-theory02.slac.stanford.edu
```

## Mathematica from outside SLAC

There are three options to use Mathematica if you are outside the SLAC network:

- **Obtain a Home License**

This is pretty straightforward, but, as stated before, the number of Home Licenses available is quite limited.  
Also note that the number of kernels available in a individual licence is 2 Processes (i.e. Mathematica Notebooks) and 8 Subprocesses (i.e. Mathematica Kernels), while the on-site license has no limits.

- **Access License Server via VPN To SLAC Network**

By following the instructions in [VPN To SLAC](#) you can remotely work as if you were on the SLAC network.  
Therefore, while the VPN is active, you can activate Mathematica by following the instructions in the **License Server** section above

- **SSH tunnel for Mathematica Authentication**

While the VPN option is convenient for authenticating Mathematica from outside SLAC, it has the drawback that it requires an active VPN connection and that tunnels ALL your network traffic through SLAC.

This can cause slowdowns while using network intensive tools like Zoom.

A more refined way of obtaining the Authentication through the epp-theory02 license server is to create an ssh tunnel only for the port that the license server is listening to (which, as of Dec 2021, is 16286).

The way to achieve this may vary from system to system, but on a standard Ubuntu20.04 machine you can achieve this via the following command

```
ssh -L 16286:127.0.0.1:16286 your-slac-username@slacEPP2
```

which tunnels the traffic of the port 16286 of your local IP 127.0.0.1 to the epp-theory02 server.

If everything works as expected you should now be able to authenticate Mathematica by choosing 127.0.0.1 as the license server. This will work as long as you keep that ssh session open.

Note that since epp-theory02 is not directly accessible remotely, in order for this ssh tunnel to work you need to have configured ssh to use one of the gateway machines as a proxyJump to epp-theory02.

Instructions on how to setup a proxyJump for our theory machines can be found at the [SLAC Theory Machines](#) page.