erc

European Research Council
Established by the European Commission

GETTING STARTED
Idefix

PART 1: ON YOUR LAPTOP ⟶ this presentation

PART 2: ON BIGFOOT (GPU) ⟶ Geoffroy's presentation

https://idefix.readthedocs.io/en/v2.0/quickstart.html

IPAG

- cmake ≥ 3.16 (+ ccmake)
- c++17 compatible compiler
  (GCC > 8 or Xcode command line tools for MacOS)
- external MPI library
  (OpenMPI, IntelMPI)
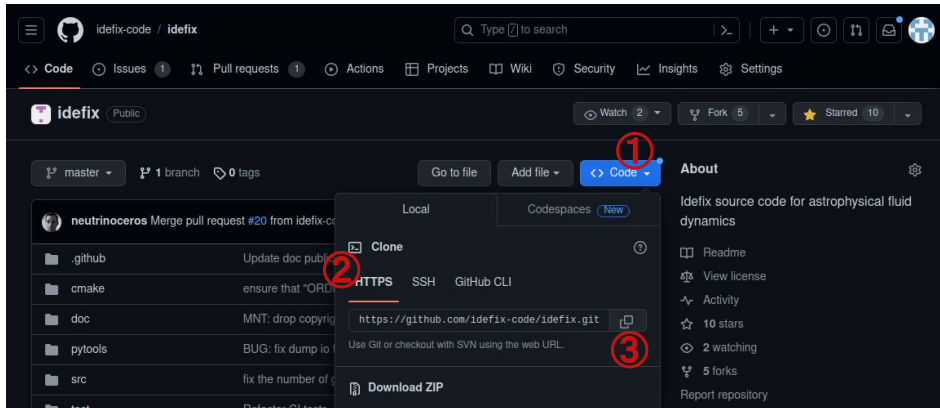- git and git-lfs
- GitHub account

1. Go to https://github.com/idefix-code/idefix

Idefix – GETTING STARTED

1. Go to https://github.com/idefix-code/idefix
2. Sign in to your GitHub account

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3. Click on *<Code>*, then *<HTTPS>* then copy the link (⧉)

1. Go to https://github.com/idefix-code/idefix
2. Sign in to your GitHub account

4. Go to your terminal, do e.g. **cd** ~/src, and type
git clone -b v2.0 https://github.com/idefix-code/idefix.git
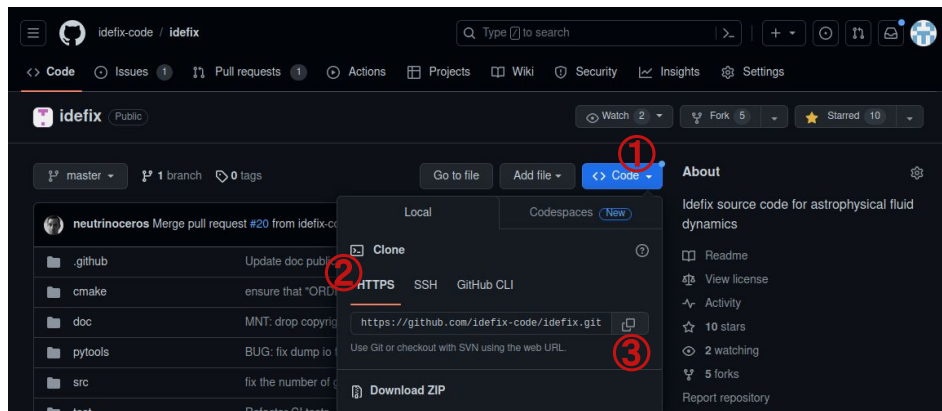
3. Click on *<Code>*, then *<HTTPS>* then copy the link (⧉)

see Clément's tutorial (git), thursday p.m

1. Go to https://github.com/idefix-code/idefix
2. Sign in to your GitHub account
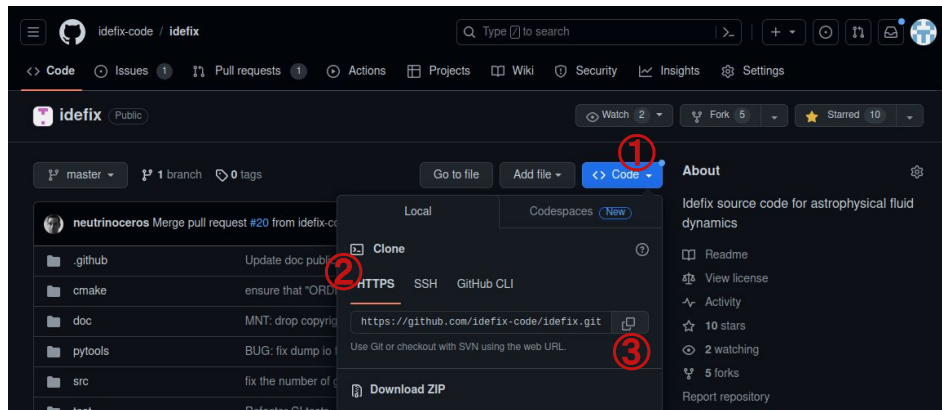
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cd idefix

$\mathcal{I}\textit{defix}$ – GETTING STARTED

1. Go to https://github.com/idefix-code/idefix
2. Sign in to your GitHub account

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4. Go to your terminal, do e.g. **cd** ~/src, and type
git clone -b v2.0 https://github.com/idefix-code/idefix.git
cd idefix
git submodule update --init

Idefix relies on the Kokkos library, embedded as a submodule.

1. Go to https://github.com/idefix-code/idefix
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3. Click on *<Code>*, then *<HTTPS>* then copy the link (⧉)

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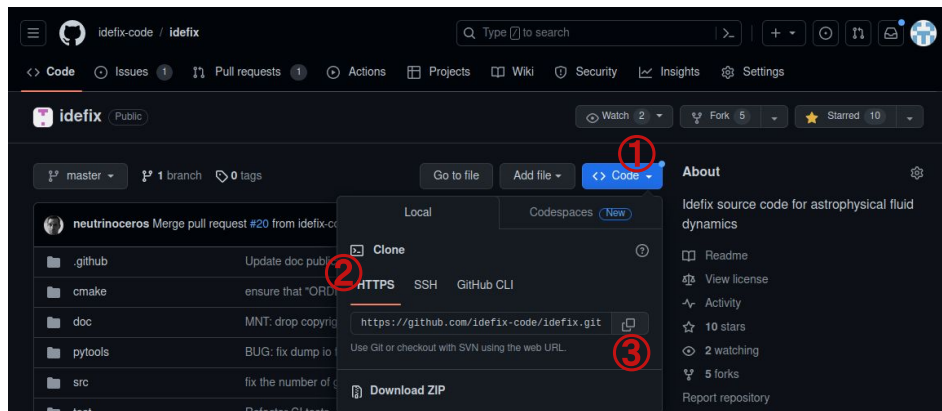git clone -b v2.0 https://github.com/idefix-code/idefix.git
cd idefix
git submodule update --init

Idefix relies on the Kokkos library, embedded as a submodule.

5. *Idefix* relies on the environment variable $IDEFIX_DIR
export $IDEFIX_DIR=~/src/idefix
You can add this line to your .profile or .bashrc

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3. Click on *<Code>*, then *<HTTPS>* then copy the link (⧉)

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git clone -b v2.0 https://github.com/idefix-code/idefix.git
cd idefix
git submodule update --init

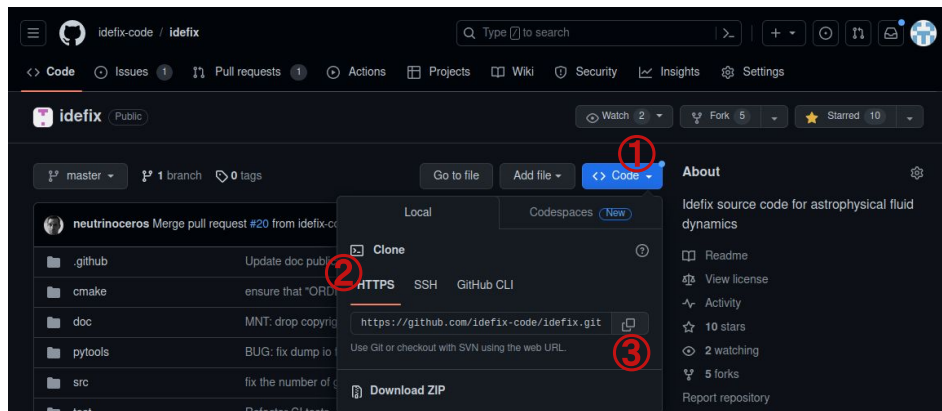*Idefix* relies on the Kokkos library, embedded as a submodule.

5. *Idefix* relies on the environment variable $IDEFIX_DIR
export $IDEFIX_DIR=~/src/idefix
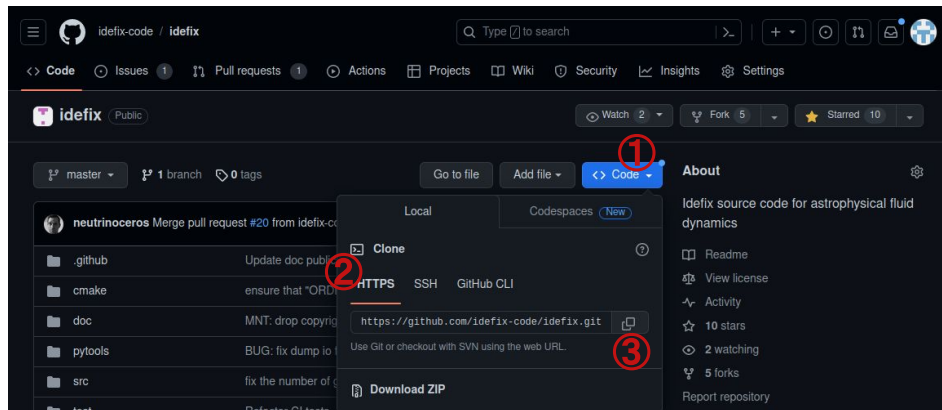You can add this line to your .profile or .bashrc

6. Validation for testing relies on large reference files
git lfs install; git lfs pull

Idefix – GETTING STARTED

Get access to all the tutorials idefix-days

1. Go to https://github.com/idefix-code/idefix-days
2. Click on *<Code>*, then *<HTTPS>* then copy the link (🗐)
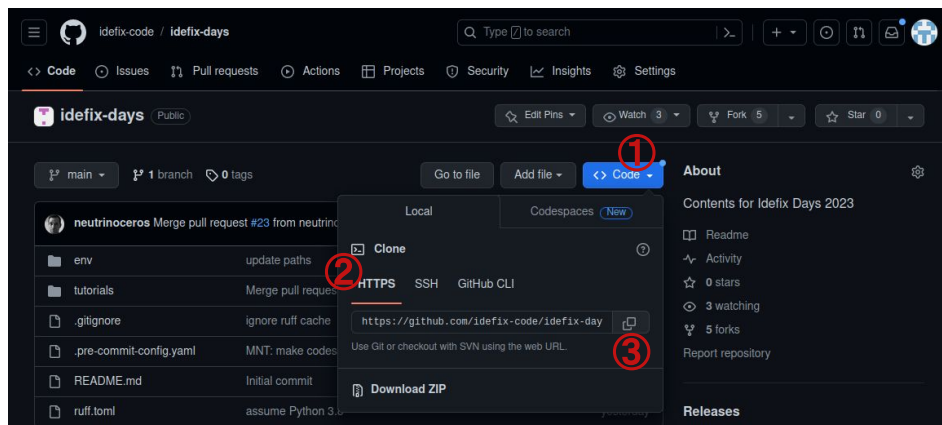
3.   Go to your terminal, do e.g. **cd** ~/src, and type
git clone https://github.com/idefix-code/idefix-days.git

cd idefix-days/tutorials/getting_started

Well-known test problem for MHD codes

`cd` OrszagTang

Well-known test problem for MHD codes

cd OrszagTang

ERROR - SERIAL

1. Configure :
    ccmake $IDEFIX_DIR

    see Jonah's tutorial (Usage), this afternoon

Idefix – GETTING STARTED

Well-known test problem for MHD codes

cd OrszagTang

ERROR - SERIAL

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS                 OFF
BUILD_TESTING                     ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX              /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                      OFF
Idefix_DEFS                       definitions.hpp
Idefix_HIGH_ORDER_FARGO           OFF
Idefix_LOOP_PATTERN               Default
Idefix_MHD                        OFF
Idefix_MPI                        OFF


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure       Press [g] to generate and exit
Press [h] for help           Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Press [c], then [c] to configure and [g] to generate

Idefix – GETTING STARTED

Well-known test problem for MHD codes
cd OrszagTang

ERROR - SERIAL

1. Configure :
   ccmake $IDEFIX_DIR

   Press [c], then [c] to configure and [g] to generate

2. Compile
   make -j 8

Well-known test problem for MHD codes

cd OrszagTang

ERROR - SERIAL

1. Configure :
    ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS                   OFF
BUILD_TESTING                       ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX                /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                        OFF
Idefix_DEFS                         definitions.hpp
Idefix_HIGH_ORDER_FARGO             OFF
Idefix_LOOP_PATTERN                 Default
Idefix_MHD                          OFF
Idefix_MPI                          OFF


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure       Press [g] to generate and exit
Press [h] for help           Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

    Press [c], then [c] to configure and [g] to generate

2. Compile   **COMPILE SHOULD FAIL !**
    make -j 8   **→ MHD run**

Well-known test problem for MHD codes
cd OrszagTang

ERROR - SERIAL

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS              OFF
BUILD_TESTING                  ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX           /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                   OFF
Idefix_DEFS                    definitions.hpp
Idefix_HIGH_ORDER_FARGO        OFF
Idefix_LOOP_PATTERN            Default
Idefix_MHD                     OFF
Idefix_MPI                     OFF


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
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```

   Press [c], then [c] to configure and [g] to generate

2. Compile   **COMPILE SHOULD FAIL !**
   make -j 8   **→ MHD run**

❶ Tip

Note that `cmake` keeps a cache of the previous configuration performed in a particular problem directory. To reset the configuration and start from scratch, delete the file *CMakeCache.txt*.

Configure, compile and run test problems
Problem 1: OrszagTang

Well-known test problem for MHD codes
cd OrszagTang

ERROR - SERIAL   rm CMakeCache.txt

SERIAL

1.   Configure :
      ccmake $IDEFIX_DIR

```
                                          Page 1 of 11
BUILD_SHARED_LIBS             OFF
BUILD_TESTING                 ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX          /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                  OFF
Idefix_DEFS                   definitions.hpp
Idefix_HIGH_ORDER_FARGO       OFF
Idefix_LOOP_PATTERN           Default
Idefix_MHD                    OFF
Idefix_MPI                    OFF


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
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2.   Compile   **COMPILE SHOULD FAIL !**
      make -j 8   **→ MHD run**

1.   Configure :
      ccmake $IDEFIX_DIR

Configure, compile and run test problems

Well-known test problem for MHD codes

Problem 1: OrszagTang

cd OrszagTang

ERROR - SERIAL

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS            OFF
BUILD_TESTING               ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX        /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                OFF
Idefix_DEFS                definitions.hpp
Idefix_HIGH_ORDER_FARGO    OFF
Idefix_LOOP_PATTERN        Default
Idefix_MHD                 OFF
Idefix_MPI                 OFF

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
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2. Compile   **COMPILE SHOULD FAIL !**
   make -j 8   **→ MHD run**

SERIAL

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS            *OFF
BUILD_TESTING               *ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX        */usr/local
Idefix_CXX_FLAGS            *
Idefix_DEBUG                *OFF
Idefix_DEFS                *definitions.hpp
Idefix_HIGH_ORDER_FARGO    *OFF
Idefix_LOOP_PATTERN        *Default
Idefix_MHD                 *ON        ENTER
Idefix_MPI                 *OFF

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
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Configure, compile and run test problems

Problem 1: OrszagTang

Well-known test problem for MHD codes
cd OrszagTang

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                                              Page 1 of 11
BUILD_SHARED_LIBS               OFF
BUILD_TESTING                   ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX            /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                    OFF
Idefix_DEFS                     definitions.hpp
Idefix_HIGH_ORDER_FARGO         OFF
Idefix_LOOP_PATTERN             Default
Idefix_MHD                      OFF
Idefix_MPI                      OFF

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
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   make -j 8   **→ MHD run**

SERIAL

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS               *OFF
BUILD_TESTING                   *ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX            */usr/local
Idefix_CXX_FLAGS                *
Idefix_DEBUG                    *OFF
Idefix_DEFS                     *definitions.hpp
Idefix_HIGH_ORDER_FARGO         *OFF
Idefix_LOOP_PATTERN             *Default
Idefix_MHD                      *ON          ← ENTER
Idefix_MPI                      *OFF

BUILD_SHARED_LIBS: Build shared libraries
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Configure, compile and run test problems

Well-known test problem for MHD codes
cd OrszagTang

Problem 1: OrszagTang

ERROR - SERIAL

1. Configure :
   ccmake $IDEFIX_DIR


```
                                            Page 1 of 11
BUILD_SHARED_LIBS               OFF
BUILD_TESTING                   ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX            /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                    OFF
Idefix_DEFS                     definitions.hpp
Idefix_HIGH_ORDER_FARGO         OFF
Idefix_LOOP_PATTERN             Default
Idefix_MHD                      OFF
Idefix_MPI                      OFF

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
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Press [c], then [c] to configure and [g] to generate

2. Compile   **COMPILE SHOULD FAIL !**
   make -j 8   **→ MHD run**

SERIAL

1. Configure :
   ccmake $IDEFIX_DIR


```
                                            Page 1 of 11
BUILD_SHARED_LIBS               *OFF
BUILD_TESTING                   *ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX            */usr/local
Idefix_CXX_FLAGS                *
Idefix_DEBUG                    *OFF
Idefix_DEFS                     *definitions.hpp
Idefix_HIGH_ORDER_FARGO         *OFF
Idefix_LOOP_PATTERN             *Default
Idefix_MHD                      *ON          ← ENTER
Idefix_MPI                      *OFF

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help           Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   ./idefix

Well-known test problem for MHD codes
cd OrszagTang

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
    ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS           OFF
BUILD_TESTING               ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX        /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                OFF
Idefix_DEFS                 definitions.hpp
Idefix_HIGH_ORDER_FARGO     OFF
Idefix_LOOP_PATTERN         Default
Idefix_MHD                  ON          → ENTER
Idefix_MPI                  ON          → ENTER


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

    Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
    make -j 8   mpirun -np 2 ./idefix

Well-known test problem for MHD codes

cd OrszagTang

Problem 1: OrszagTang

PARALLEL - MPI library   rm CMakeCache.txt

PARALLEL - openmp   rm CMakeCache.txt

1. Configure :
   ccmake $IDEFIX_DIR

```
                                        Page 1 of 11
BUILD_SHARED_LIBS            OFF
BUILD_TESTING               ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX        /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                OFF
Idefix_DEFS                 definitions.hpp
Idefix_HIGH_ORDER_FARGO     OFF
Idefix_LOOP_PATTERN         Default
Idefix_MHD                  ON            ENTER
Idefix_MPI                  ON            ENTER

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help        Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   mpirun -np 2 ./idefix

1. Configure :
   ccmake $IDEFIX_DIR

```
                                        Page 2 of 13
Idefix_MHD                  *ON       ENTER
Idefix_MPI                  *OFF
Idefix_PRECISION            *Double
Idefix_RECONSTRUCTION       *Linear
Idefix_WERROR               *OFF
Kokkos_ARCH_A64FX           *OFF
Kokkos_ARCH_AMDAVX          *OFF
Kokkos_ARCH_AMPERE80        *OFF


Kokkos_ENABLE_OPENMP        *ON       ENTER
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help        Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   ./idefix
   export OMP_NUM_THREADS=2

Idefix – GETTING STARTED

Well-known test problem for MHD codes
cd OrszagTang

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
   ccmake $IDEFIX_DIR

```
                                        Page 1 of 11
BUILD_SHARED_LIBS           OFF
BUILD_TESTING               ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX        /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                OFF
Idefix_DEFS                 definitions.hpp
Idefix_HIGH_ORDER_FARGO     OFF
Idefix_LOOP_PATTERN         Default
Idefix_MHD                  ON              ENTER
Idefix_MPI                  ON              ENTER


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

   Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   mpirun -np 2 ./idefix

PARALLEL - openmp   rm CMakeCache.txt

1. Configure :
   ccmake $IDEFIX_DIR

```
                                        Page 2 of 13
Idefix_MHD                  *ON        ENTER
Idefix_MPI                  *OFF
Idefix_PRECISION            *Double
Idefix_RECONSTRUCTION       *Linear
Idefix_WERROR               *OFF
Kokkos_ARCH_A64FX           *OFF
Kokkos_ARCH_AMDAVX          *OFF
Kokkos_ARCH_AMPERE80        *OFF


Kokkos_ENABLE_OPENMP        *ON        ENTER
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

   Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   ./idefix
   export OMP_NUM_THREADS=2

Configure, compile and run test problems
Problem 2: PlanetMigration2D

Test problem Planet/Disk interaction
`cd` PlanetMigration2D

will be used in my tutorial (visualization/nonos),
tomorrow afternoon

Test problem Planet/Disk interaction
cd PlanetMigration2D

PARALLEL - MPI library   rm CMakeCache.txt

1.   Configure :
      ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS              OFF
BUILD_TESTING                  ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX           /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                   OFF
Idefix_DEFS                    definitions.hpp
Idefix_HIGH_ORDER_FARGO        OFF
Idefix_LOOP_PATTERN            Default
Idefix_MHD                     ON
Idefix_MPI                     ON          ─────→  ENTER

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

      Press [c], then [c] to configure and [g] to generate

2.   Compile   3.   Run
      make -j 8   mpirun -np 2 ./idefix

Test problem Planet/Disk interaction
cd PlanetMigration2D

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
    ccmake $IDEFIX_DIR

```
                                          Page 1 of 11
BUILD_SHARED_LIBS               OFF
BUILD_TESTING                   ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX            /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                    OFF
Idefix_DEFS                     definitions.hpp
Idefix_HIGH_ORDER_FARGO         OFF
Idefix_LOOP_PATTERN             Default
Idefix_MHD                      ON
Idefix_MPI                      ON      ⟶  ENTER


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
    make -j 8   mpirun -np 2 ./idefix

"Automatic domain decomposition requires nx1, nx2 and nx3 to be powers of 2. Alternatively, set a manual decomposition with -dec"

Idefix – GETTING STARTED

Test problem Planet/Disk interaction
cd PlanetMigration2D

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS                OFF
BUILD_TESTING                    ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX             /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                     OFF
Idefix_DEFS                      definitions.hpp
Idefix_HIGH_ORDER_FARGO          OFF
Idefix_LOOP_PATTERN              Default
Idefix_MHD                       ON
Idefix_MPI                       ON          ──→ ENTER


BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   mpirun -np 2 ./idefix

Configure, compile and run test problems
Problem 2: PlanetMigration2D

"Automatic domain decomposition requires nx1, nx2 and nx3 to be powers of 2. Alternatively, set a manual decomposition with -dec"

```
[Grid]                                      idefix.ini
X1-grid     1   0.42      192   u   2.14
X2-grid     1   0.0       768   u   6.283185307179586
X3-grid     1   -0.0125   1     u   0.0125
```

Test problem Planet/Disk interaction
cd PlanetMigration2D

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
    ccmake $IDEFIX_DIR

```
                                                Page 1 of 11
BUILD_SHARED_LIBS            OFF
BUILD_TESTING               ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX        /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                OFF
Idefix_DEFS                 definitions.hpp
Idefix_HIGH_ORDER_FARGO     OFF
Idefix_LOOP_PATTERN         Default
Idefix_MHD                  ON
Idefix_MPI                  ON        ──→  ENTER

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help            Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

    Press [c], then [c] to configure and [g] to generate

2. Compile   3.   Run
    make -j 8   mpirun -np 2 ./idefix

"Automatic domain decomposition requires nx1, nx2 and nx3 to be powers of 2. Alternatively, set a manual decomposition with -dec"

```
[Grid]                                        idefix.ini
X1-grid     1   0.42      192   u   2.14
X2-grid     1   0.0       768   u   6.283185307179586
X3-grid     1   -0.0125   1     u   0.0125
```

-dec n1 n2 n3 : **domain decomposition**

Idefix – GETTING STARTED

Test problem Planet/Disk interaction
cd PlanetMigration2D

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS               OFF
BUILD_TESTING                   ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX            /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                    OFF
Idefix_DEFS                     definitions.hpp
Idefix_HIGH_ORDER_FARGO         OFF
Idefix_LOOP_PATTERN             Default
Idefix_MHD                      ON
Idefix_MPI                      ON        ──→  ENTER

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help           Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

   Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   mpirun -np 2 ./idefix

"Automatic domain decomposition requires nx1, nx2 and nx3 to be powers of 2. Alternatively, set a manual decomposition with -dec"

```
[Grid]                                          idefix.ini
X1-grid     1   0.42    192   u   2.14
X2-grid     1   0.0     768   u   6.283185307179586
X3-grid     1   -0.0125  1    u   0.0125
```

-dec n1 n2 n3 : **domain decomposition**
          → should be equal to DIMENSIONS

```
#define    COMPONENTS      3          definitions.hpp
#define    DIMENSIONS      2

#define    ISOTHERMAL

#define    GEOMETRY        POLAR
```

see Jonah's tutorial (Usage), this afternoon

Idefix – GETTING STARTED

Test problem Planet/Disk interaction
cd PlanetMigration2D

PARALLEL - MPI library   rm CMakeCache.txt

1. Configure :
   ccmake $IDEFIX_DIR

```
                                              Page 1 of 11
BUILD_SHARED_LIBS              OFF
BUILD_TESTING                  ON
CMAKE_BUILD_TYPE
CMAKE_INSTALL_PREFIX           /usr/local
Idefix_CXX_FLAGS
Idefix_DEBUG                   OFF
Idefix_DEFS                    definitions.hpp
Idefix_HIGH_ORDER_FARGO        OFF
Idefix_LOOP_PATTERN            Default
Idefix_MHD                     ON
Idefix_MPI                     ON          → ENTER

BUILD_SHARED_LIBS: Build shared libraries
Press [enter] to edit option Press [d] to delete an entry
Press [c] to configure
Press [h] for help          Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

   Press [c], then [c] to configure and [g] to generate

2. Compile   3. Run
   make -j 8   mpirun -np 2 ./idefix **-dec 2 1**

Configure, compile and run test problems
Problem 2: PlanetMigration2D

"Automatic domain decomposition requires nx1, nx2 and nx3 to be powers of 2. Alternatively, set a manual decomposition with -dec"

```
[Grid]                                        idefix.ini
X1-grid    1   0.42     192   u   2.14
X2-grid    1   0.0      768   u   6.283185307179586
X3-grid    1  -0.0125   1     u   0.0125
```

-dec n1 n2 n3 : **domain decomposition**
        → should be equal to DIMENSIONS

```
#define    COMPONENTS    3          definitions.hpp
#define    DIMENSIONS    2

#define    ISOTHERMAL

#define    GEOMETRY      POLAR
```

Test problem Planet/Disk interaction
`cd` PlanetMigration2D

Test problem Planet/Disk interaction
cd PlanetMigration2D

Most of the tests in the test/ directory can be validated against:
- analytical solution (standard test)
- pre-computed solutions (non-regression tests).

```
Running standard test...
diff_torque=1.726052e-19
Error_dist=0.000000e+00
SUCCESS!
Standard test succeeded
Non-regression test succeeded with error=2.809121e-15
```

RULE: All the tests **HAVE TO** pass to merge a pull-request.
It is therefore a good practice to run locally the tests before creating a pull-request!

Example: If Clément implements a new module to simulate Lagrangian particles (***see his talk tomorrow morning***), all the pre-existing tests in IDEFIX have to pass in order for his module to be merged!

1. ./testme.py -all   Full validation of a test (**configure**/**compile**/**run**/**test** various combination of algorithms)
2. ./testme.py   Partial validation of a test (**run**/**test** various input files)
3. ./testme.py -check Validation of a test that has already been run