# extensibleFactory example

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Geant4 2018 Collaboration Mtg - Parallel 6B:
    basic, extended and advanced examples

30 August 2018

# Purpose: Demonstrates use of extensible factory

Built upon "factory" example as a base.

- Only necessary change to switch is:

```
-    #include "G4PhysListFactory.hh"
+    #include "G4PhysListFactoryAlt.hh"
+    using namespace g4alt;
+ // no further changes to the code are required
```

Same use of -p flag or $PHYLIST environment variable to pick physics list.

All other changes in the example are there to demonstrate extra functionality provided by the alternative factory.

# Extending existing physics lists

Out of the box the alternative factory allows all known physics lists to be extended by adding / replacing physics constructors:

`-p FTFP_BERT_EMX+G4OpticalPhysics+RADIO`

base physList    em replacement    added phys ctor    added phys ctor

internal to the example, `RADIO` is registered as shorthand for `G4RadioactiveDecayPhysics` via a call to:

```
G4PhysListRegistry* plreg = G4PhysListRegistry::Instance();
plreg->AddPhysicsExtension("RADIO","G4RadioactiveDecayPhysics");
```

`+` = adds physics constructor via `RegisterPhysics()`

`_` = replaces physics constructor via `ReplacePhysics()`

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# Other features

Demonstrate registering application specific physics list "MySpecialPhysList" with the extensible factory:

```
#include "G4PhysListStamper.hh"  // defines macro for factory registration
#include "MySpecialPhysList.hh"
G4_DECLARE_PHYSLIST_FACTORY(MySpecialPhysList);
```

Demonstrate how to override, for this specific application, the kernel default physics list "FTFP_BERT"

```
factory.SetDefaultReferencePhysList(newDefaultPhysListName);
```

Additional command line flag:

-h : list known physics lists

-h -h: list physics constructors (and shorthands) as well

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# Other features

If physics list specified by -p flag (or if none given, one specified by non-blank $PHYLIST variable) **_isn't_** available, perhaps due to a typo, _throw an exception_ rather than silently run the default `FTFP_BERT`