CMS Particle Gun Issue

- generate & decay a single tau with Pythia
  - particle gun
  - tau has production vertex
- HepMC does not save production vertex of initial particle
- HepMC expects that initial particles do not have production vertices
- clearly a special case

IO_HEPEVT

- user cannot add initial vertex on their own
- need to set some flag for IO_HEPEVT
- already have trust_beam_particles()
- but having no beam particles is not the same as using a particle gun
- also, using a particle gun does not imply that the incoming particle will have a production vertex
- will IO_HERWIG also need this?

Possible Solution A

- using_particle_gun()
  - sets flag to save production vertex of initial particle
  - also sets trust_beam_particles to false
  - user code:

```
HepMC::IO_HEPEVT hepevtio;

hepevtio.set_using_particle_gun(true);
```

- single call, but see previous page

Possible Solution B

- have_incoming_vertex()
  - sets flag to save production vertex of initial particle
  - user code:

```
HepMC::IO_HEPEVT hepevtio;
hepevtio.set_trust_beam_particles(false);
hepevtio.set_have_incoming_vertex(true);
```

- user has 2 calls, but the intent may be more clear
- problem - incoming vertex with beam particles?
- need a better function name?