

IDS Issues: Proton Driver

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Proton Driver

The Problem

- Bunch train structure
 - Multiple bunches per pulse
 - Target all bunches within $40 \mu\text{s}$
 - ✧ Maybe longer possible: MERIT results!
 - Beam loading: different trains gain different energy
 - For reasonable power into cavities, need at least $150\text{--}200 \mu\text{s}$ to keep energies same

All Trains Gain Same Energies

- Not enough time to replenish voltage
 - Non-problem if target allows longer time
- Biggest problem in FFAG: passes through RF
- Requires at least three nearby RF frequencies
 - Also excess voltage
- No viable scheme as yet
- Depends on bunch current
 - Retune when current changes

Proton Driver Proposal

Single Bunch



- Single bunch at 50 Hz
- Use higher energy
 - Only modest loss in production
 - Fewer particles, less space charge early
 - Easier to get short bunch
- Difficulties
 - Repetition rate
 - Cost of extra acceleration