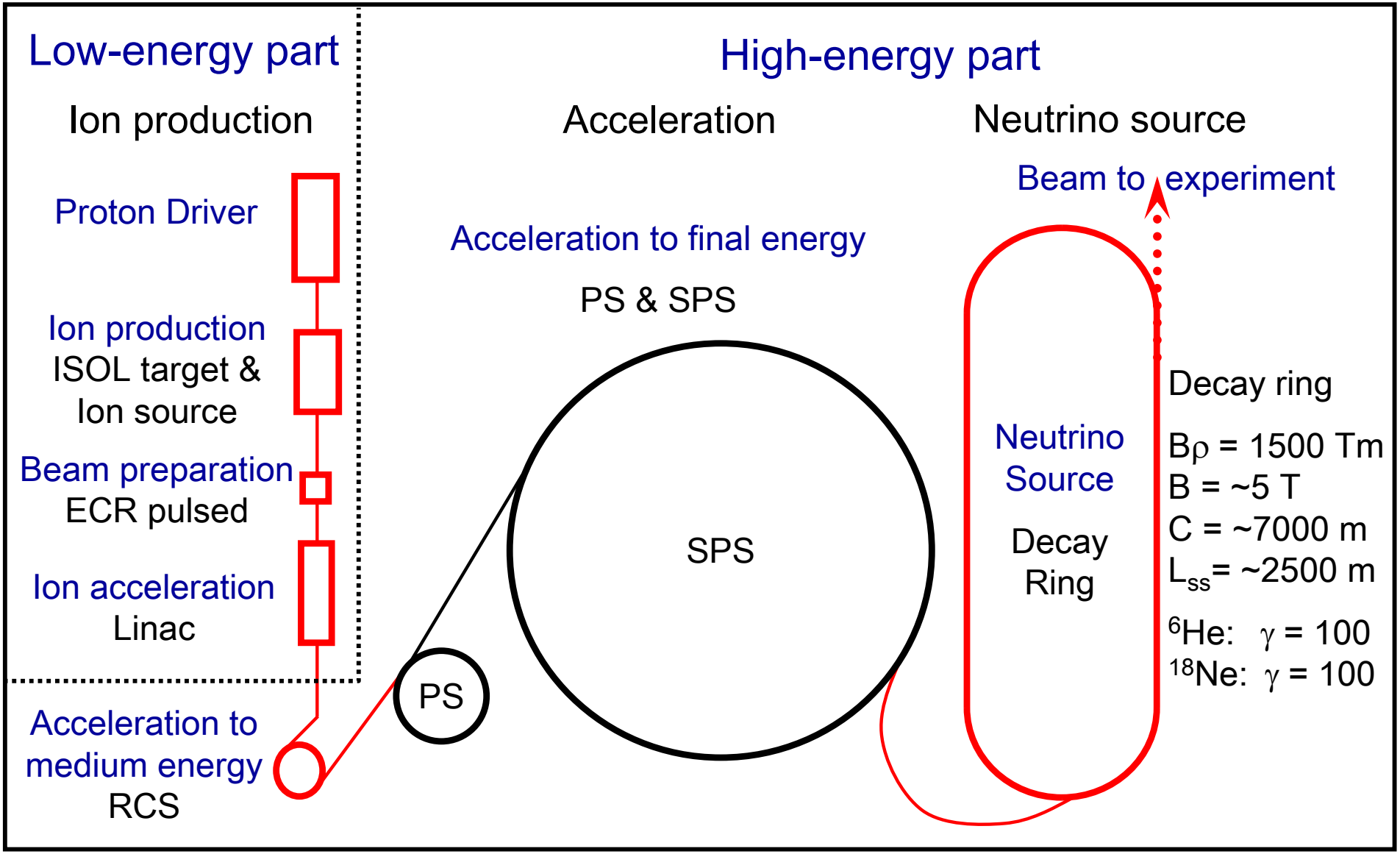
Beta-Beam Task Meeting
Introduction and Status

17. October 2005, Saclay

Contents

- Overview
- Base line scenario version 1 from last task meeting
- Modifications version 1 to version 2
- Performance version 2
- Goals for the meeting

Base line design



Baseline version 1 at TM1

Version 1:

- 16 Hz operation of ECR and RCS.
- Accumulate ions from “production part” during 1s into PS 16 bunches.
- 16 bunches merged to 8 in PS at high energy (for duty factor).
- 8 bunches accelerated in SPS and injected into decay ring.
- Merging in decay ring over 15 injector cycles.

Main problems of version1:

- Large missing factor (~50) in intensity for 18Ne.
- Intensity for 6He ~1/3 of physics request.
- Excessive space charge at PS injection.

From TM1 to TM2

Major modification from version1 to version2:

- 10 Hz operation of RCS and ECR (100 ms accumulation time in ECR for intensity increase).
- No modifications on ion production side (# of targets, etc.), only change is ECR frequency. ECR performance expectations like for version 1.
- Use of all possible RF buckets in the PS (10 MHz system allows for h=21). 20 buckets filled, one empty for the kicker.
- No bunch merging in PS at top energy at expense of duty factor.
- RCS energy range increased from $B\rho$ = 8 Tm to 11 Tm to decrease space charge effects at PS injection.
- Increased number of merges in decay ring for 18Ne. Larger bucket acceptance for 18Ne.

Baseline at TM2

Performance version 2:

- For 6He design intensity reached but no safety margin.
- Improvement for 18Ne by factor ~2.5 due to modifications.
- 20 bunches in the decay ring – duty factor less favorable.

	Design values	Version 1	Version 2
Neutrino flux (ν/year)	$2.9*10^{18}$ ($1.1*10^{18}$)	$1.76*10^{18}$ ($0.02*10^{18}$)	$2.9*10^{18}$ ($0.05*10^{18}$)
Duty factor		$2*10^{-3}$ ($2*10^{-3}$)	$4.5*10^{-3}$ ($3.9*10^{-3}$)
Satisfaction [%]	-	30 (1.7)	100 (4)

Open issues version 2:

- Still large missing factor for 18Ne (improvements on production side?).

Goals for the meeting (i)

Review of base line version 2 (6He, 18Ne, γ=100 for both).

- Convergence of parameter list (and completeness).
- Check for limitations, flexibility in the design and show-stoppers.
- Preparation for more detailed design and analysis work
  - Example RF: simulations of longitudinal dynamics, required voltages, -> hardware requirements, space in RCS and Decay Ring.
  - Example beam (decay) losses: Detailed simulations, Collimation requirements, SC magnets in decay ring, etc.

Discussion of potential improvements to version 2.

- Rely on improvements of 18Ne production.
- ?

Goals for the meeting (ii)

Status of related EURISOL tasks.

- Base line depends critically on 18Ne production.
- Base line depends critically on 60 GHz ECR source developments.

Discussion of issues outside the present base line:

- FFAG as alternative to EURISOL post accelerator
- Dedicated for Beta-beam
- Accumulation at low energy (before/after RCS).
  - Basic parameters and feasibility.
  - Improvements to base line design.

Introduction and Base Line Parameters		
09:30	Introduction and status	M. Benedikt
09:50	Parameter list	A. Fabich
Beta-Beam Task – Status and Progress **Baseline Version 2**		
10:15	RCS parameters for 10/20 Hz operation	A. Tkatchenko
10:40	Decay ring design status	J. Payet
11:05	Coffee	
11:20	Decay losses in RCS, PS and SPS	A. Fabich
11:45	Beam loss distributions and dynamic vacuum effects in PS and SPS	P. Spiller
12:10	Loss simulation for the decay ring	F. Jones
12:35	Intensity limitations for the base line design	S. Hancock
13:00	Lunch	
Related EURISOL Tasks – Status and Planning		
14:15	6He / 18Ne production scenarios and status of task 3	M. Loiselet
14:40	Status report on the 60 GHz ion source investigations	P. Delahaye
15:05	Coffee	
Non-baseline Issues		
15:20	Ion accumulation and cooling at low energy	A. Källberg
15:45	FFAG option for the post accelerator	F. Meot
16:10	Discussion	all
17:00	END	