Chicane optimization Discussion

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Plan

1. Zeuten chicane

2. Conclusion & Questions

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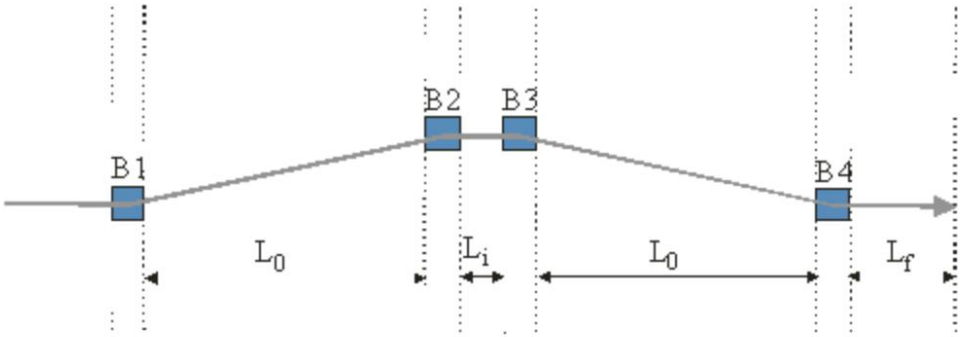
Zeuten chicane



Parameters	*Symbol*	*Value*	*Unit*
Bend magnet length (projected)	L_b	0.5	m
Drift length B1->B2 and B3->B4 (projected)	L_0	5.0	m
Drift length B2->B3	L_i	1.0	m
Post chicane drift	L_f	2.0	m
Bend radius of each dipole magnet	R	10.35	m
Bending Angle	f	2.77	deg
Momentum compaction	R_{56}	-25	mm
2nd order momentum compaction	T_{566}	+37.5	mm
Total projected length of chicane	L_{tot}	13.0	m
Vertical half gap of bends	g	2.5, 5	mm

Longitudinal beam chirp

- **Chirp from positron distribution**

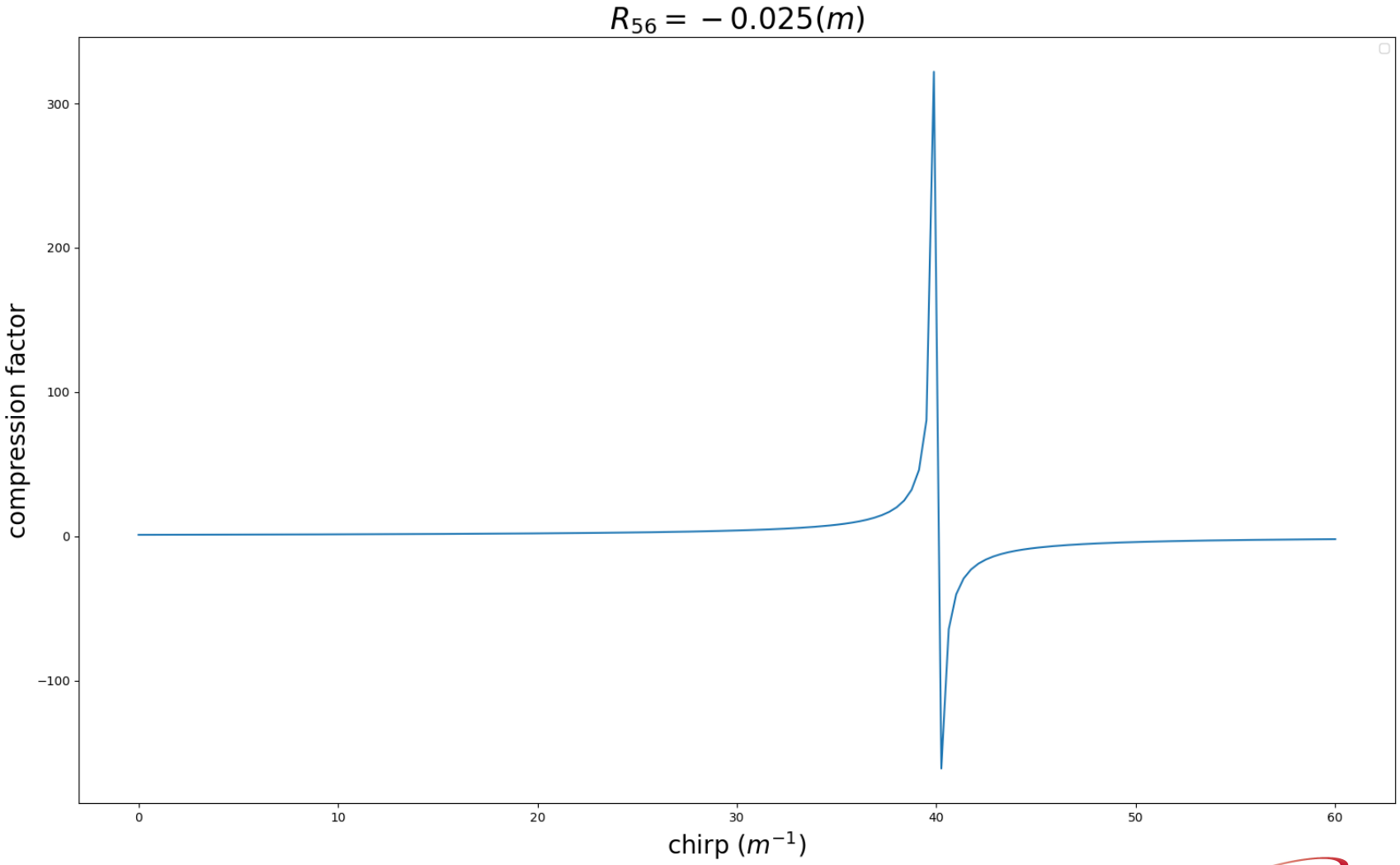
$$h = \frac{\Delta E}{L_{bench} E_0}$$

- **Using z & $\frac{\Delta P}{P}$ space, we have:**

$$\kappa = \frac{d\delta_p}{dz} = \frac{-keV_0}{E0 + eV0\cos\phi}\sin\phi$$

Compression factor

- $R_{56} = -0.025$ m



Compression factor

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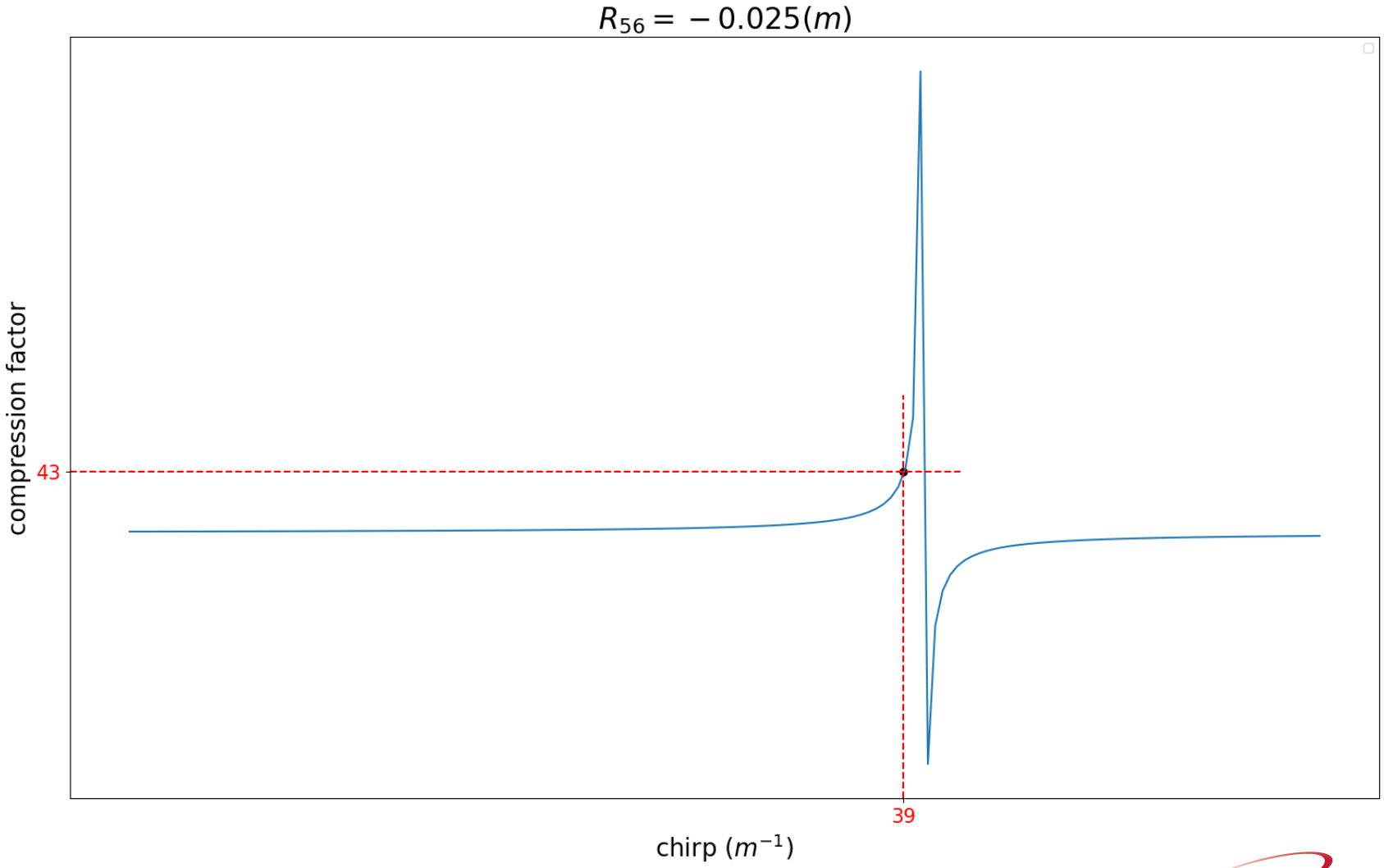
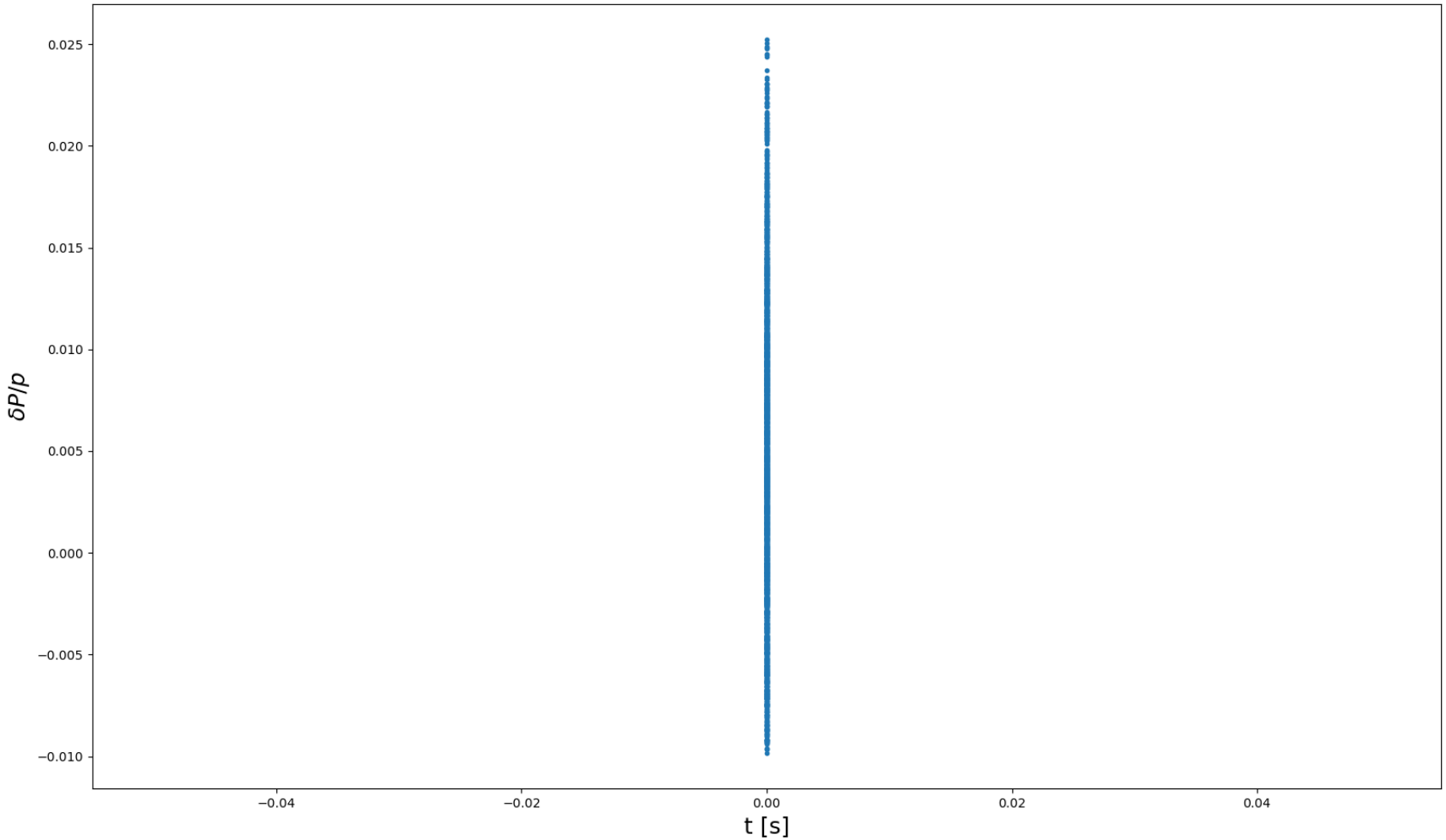
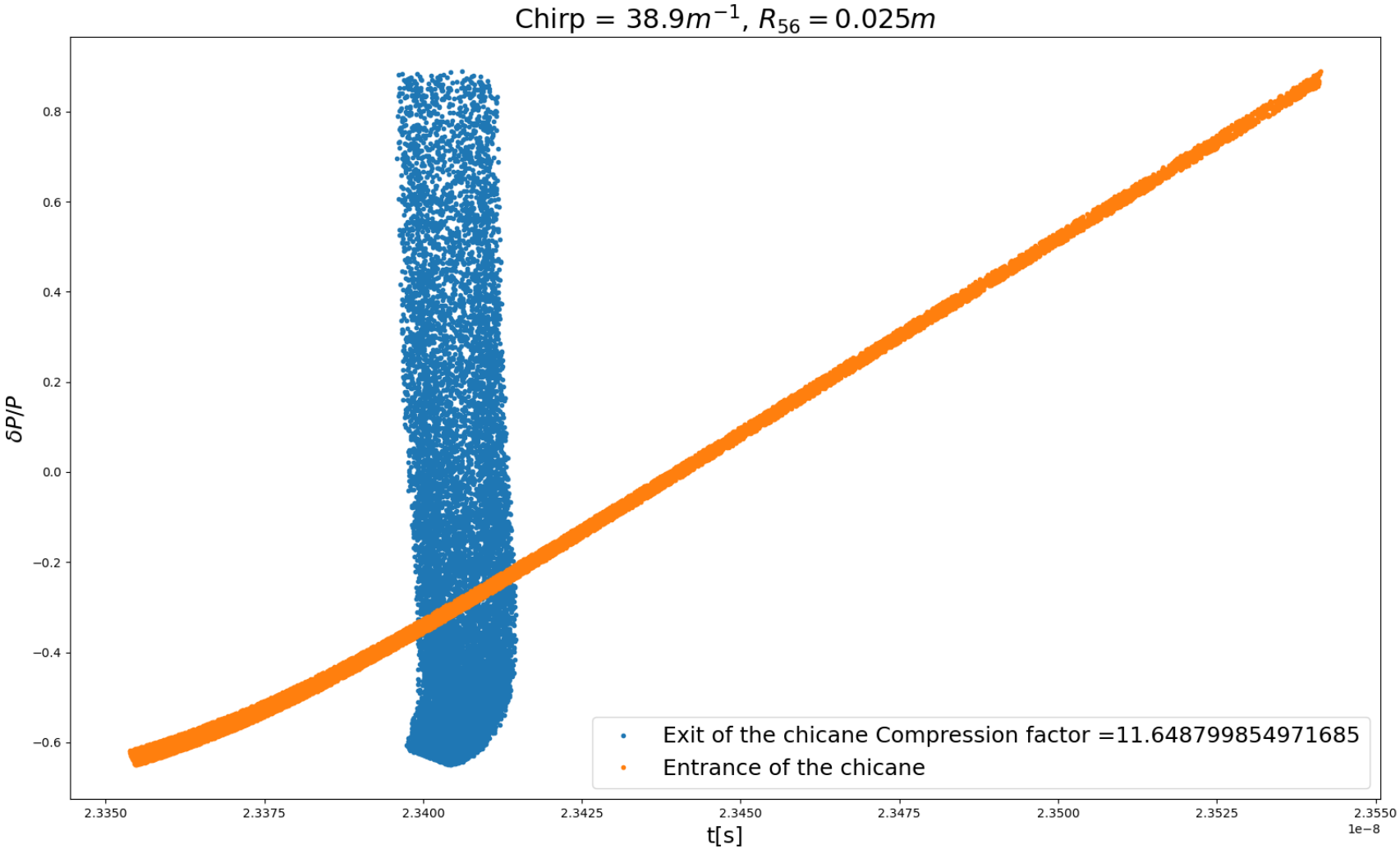


Initial Longitudinal phase space

- No longitudinal correlation.



Compression



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Conclusion

- Compression depends on the quality of the incoming beam.
- We need cavity to create chirp.
- To be continued ...