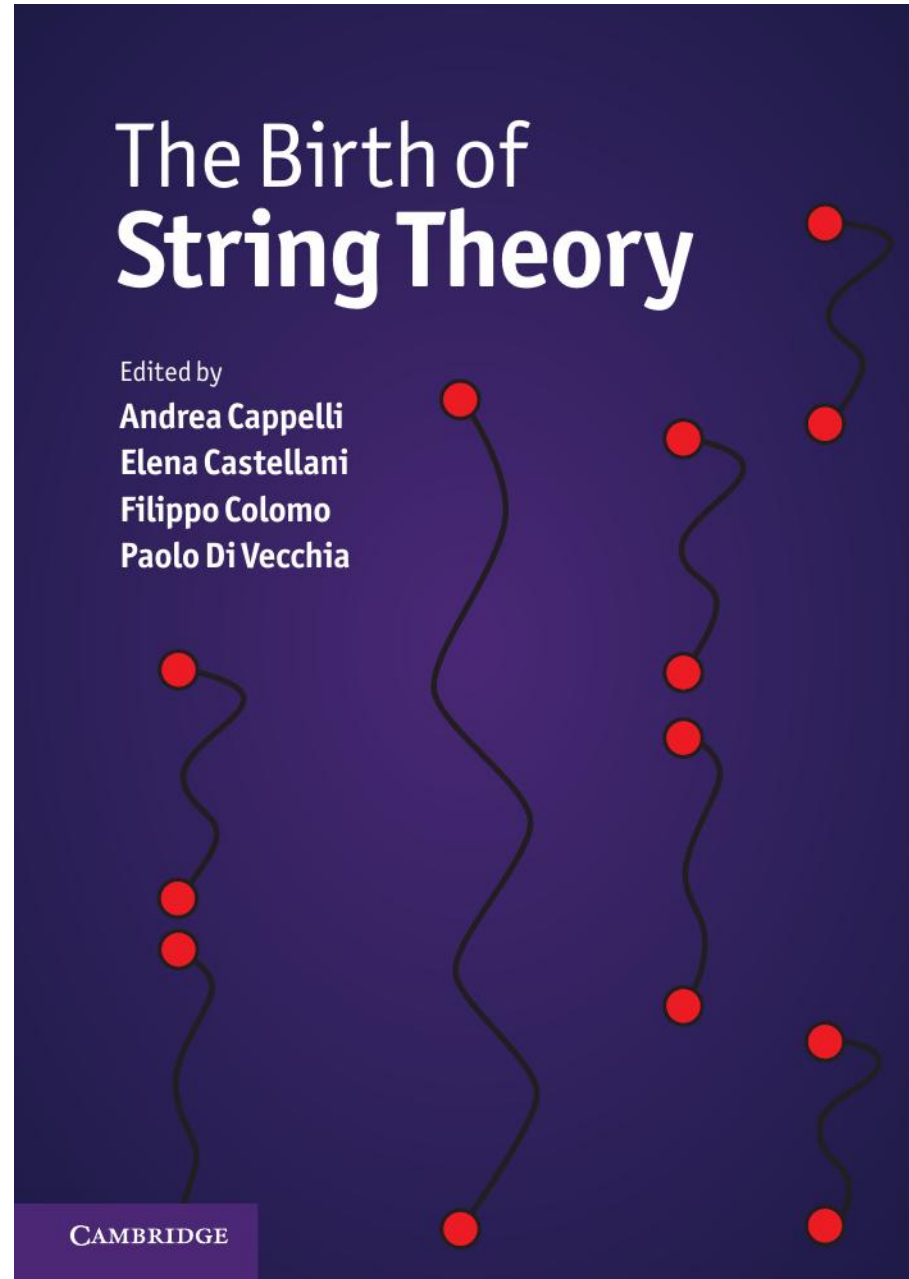


Outline

- book content
- motivations
- storyline



Content

- history from 1968 (Veneziano amplitude) to 1984 (first string revolution)
- 7 parts with introductions, 35 contributors and 5 appendices:

I. Overview

(Veneziano, Schwarz, E. Castellani)

II. The prehistory: the analytic S-matrix

*(Ademollo, Rubinstein,
Freund, Gell-Mann)*

III. The Dual Resonance Model

*(Di Vecchia, Shapiro, Amati, Clavelli,
Lovelace, Musto, Nicodemi, Sciuto)*

IV. The string

*(Goddard, Susskind, Nielsen, Nambu,
Fairlie, Mandelstam, Brower)*

V. Beyond the bosonic string

*(Olive, Ramond, Neveu, Corrigan,
Bardakci & Halpern, Gervais, Montonen)*

VI. The superstring

*(Gliozzi, Yoneya, Brink, Di Vecchia,
Cremmer, Schwarz)*

VII. Preparing the string renaissance

(Green, Polyakov, Cappelli & Colomo)

Motivations

- seminar on history & philosophy of physics in Florence

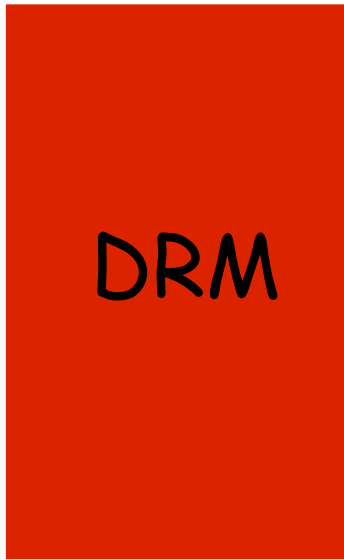


playing with ideas



- workshop on string history at the Galileo Galilei Institute in May 2007
- the early string:
 - a “scientific saga”
 - ideas that found many other applications
 - an Italian “treasure”, with many contributors
and two mentors: Fubini and Amati

1968



BIRTH



HADRONIC STRING

1974



DEATH



UNIFICATION
IDEA



INCUBATION OF
SUPERSTRING


1984



REBIRTH

1968	DRM STRING	←	four-meson amplitude	<i>Veneziano</i>
1969		←	string idea	<i>Nielsen, Susskind, Nambu</i>
1970		←	spectrum of DRM	<i>Fubini, many people</i>
1971		←	fermionic string	<i>Ramond, Neveu & Schwarz</i>
		←	extra dimensions	<i>Lovelace</i>
		←	world-sheet supersymmetry	<i>Gervais & Sakita</i>
1972		←	covariant quantization	<i>Di Vecchia, Fubini, many people</i>
		←	field-theory limit	<i>Scherk, Neveu, Yoneya</i>
1973		←	light-cone quantization	<i>Goddard, Goldstone, Rebbi, Thorn</i>
1974		←	interacting strings	<i>Ademollo et al., etc.</i>

Hadronic string

- Reasons to be born
 - Regge trajectories with universal slope (& Regge behaviour)
 - Veneziano amplitude: simple closed-form solution to bootstrap
- Reasons to die
 - $D=26$
 - $\alpha(0) = 1, 2$, i.e. massless particles with spin 1 and 2
 - soft scattering  Deep Inelastic Scattering & QCD

1974	←	gauge & gravity unification	<i>Scherk & Schwarz, Yoneya</i>
	←	space-time supersymmetry	<i>Wess & Zumino</i>
1976	←	Kaluza-Klein compactification	<i>Cremmer, Scherk</i>
	←	open superstring (type I)	<i>Giozzi, Scherk, Olive</i>
	←	RNS string action	<i>Brink, Di Vecchia, Howe; Deser & Zumino</i>
	←	supergravity	<i>Freedman, Van Nieuwenhuizen, Ferrara</i>
1978	←	d=11 supergravity	<i>Cremmer, Julia, Scherk</i>
1980	←	modern covariant string quantization	<i>Polyakov</i>
	←	IIA & IIB closed superstrings	<i>Green & Schwarz</i>
1982	←	gravitational anomalies	<i>Alvarez-Gaumé & Witten</i>
1984	←	anomaly cancellation in type I	<i>Green & Schwarz</i>
	←	heterotic strings	<i>Gross, Harvey, Martinec, Rohm</i>
	←	Calabi-Yau compactifications	<i>Candelas, Horowitz, Strominger, Witten</i>

Superstring

- Reasons to be reborn



unification of gauge theories and gravity beyond the SM, with:

- chiral fermions without chiral anomalies
- supergravity without infinities
- five (six) consistent theories

- Reasons to die again

-

String theory at large

- supersymmetry
- conformal field theory  statistical mechanics & condensed matter
- theoretical physics  many areas of mathematics
- gauge/gravity correspondence
-

About history

"The garbage of the past often becomes the treasure of the present (and *vice versa*)",

A. M. Polyakov

"When a good idea is around, many people have it at the same time: the credit goes to the one that explains it better",

S. Fubini