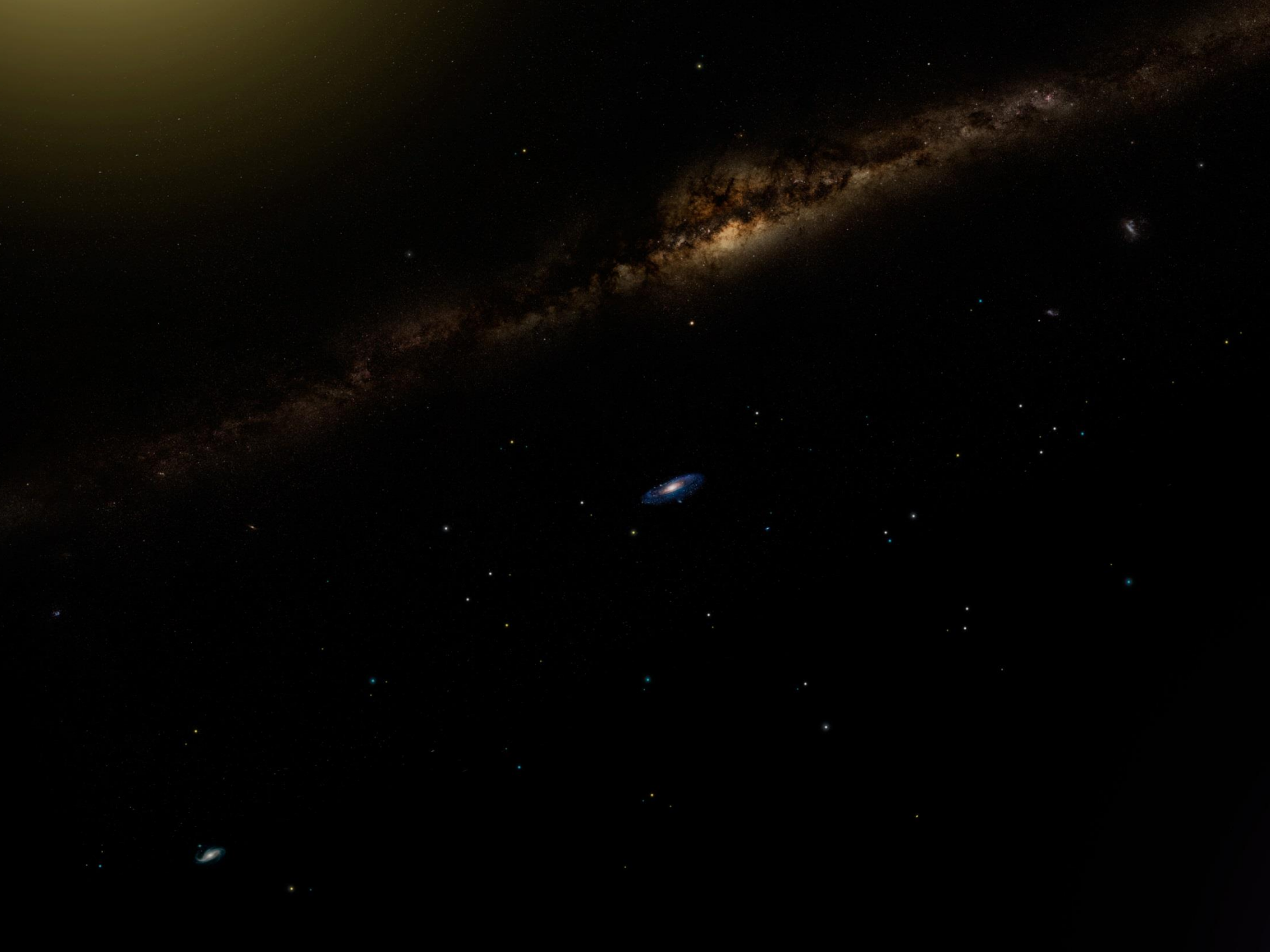
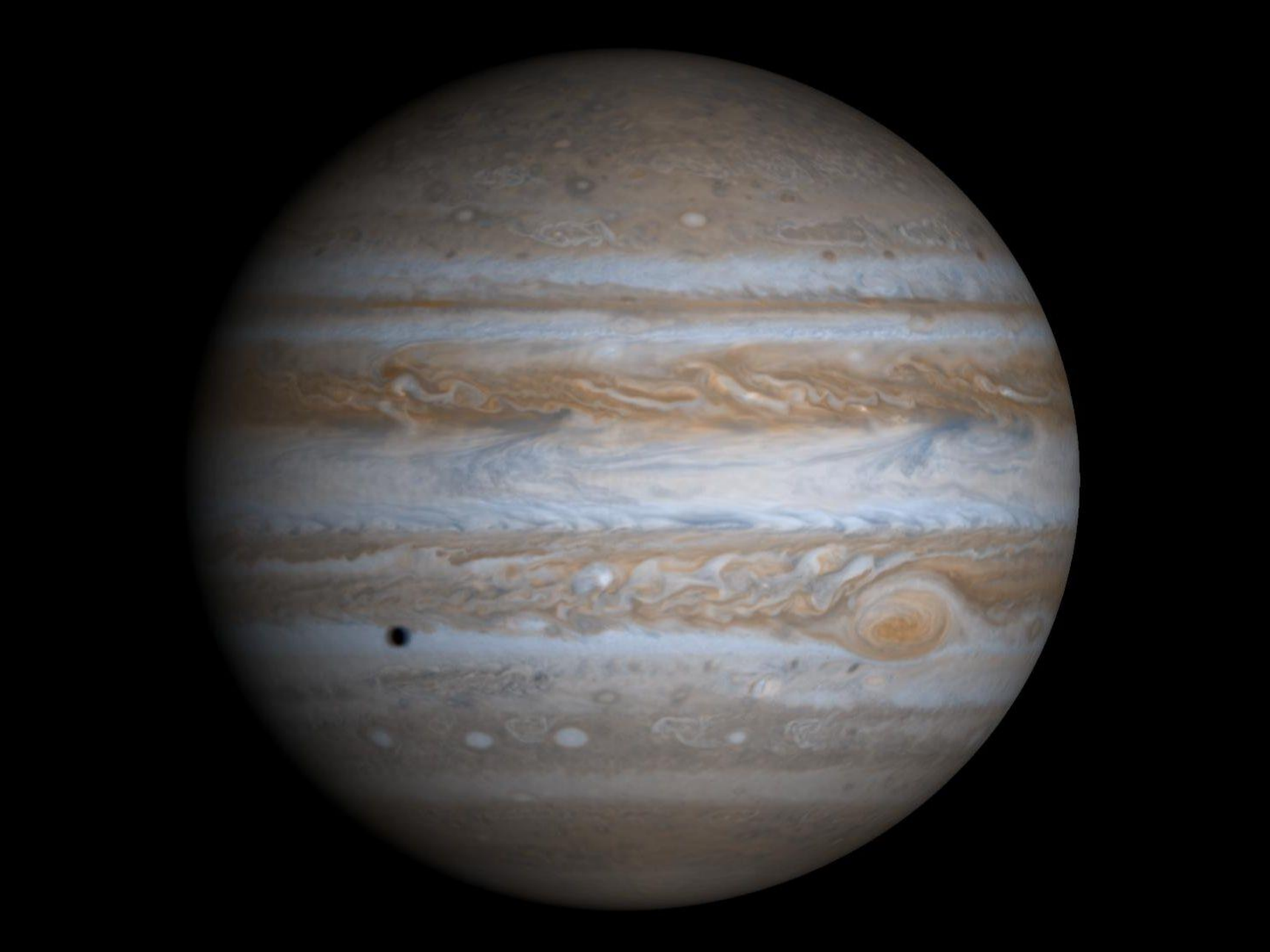
FESTKOLLOQUIUM

anlässlich des 60. Geburtstages von
Prof. Dr.-Ing. Arnold Kühhorn

Lokale Schwingungen und Wellen in nichtlinearen physikalischen Systemen

Norbert Hoffmann, Imperial College London






富嶽三十六景
神奈川沖
浪裏

Disk Drives

such situation.

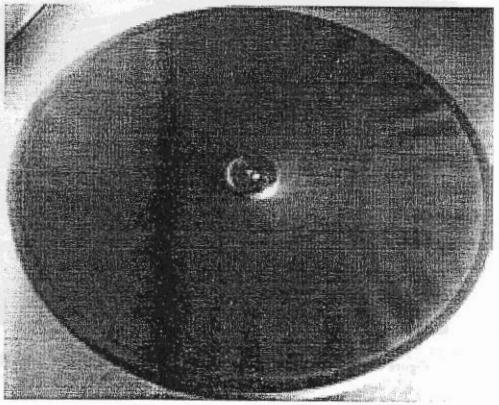


Figure 4. SPINNING DISK WITH HARMONIC WAVE

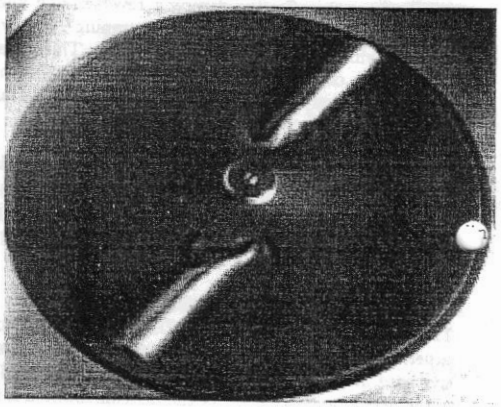


Figure 6. SPINNING DISK WITH TWO SOLITARY WAVES

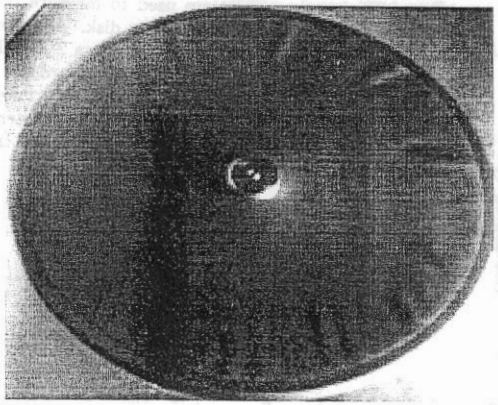


Figure 5. SPINNING DISK WITH NON-COHERENT WAVE PATTERN

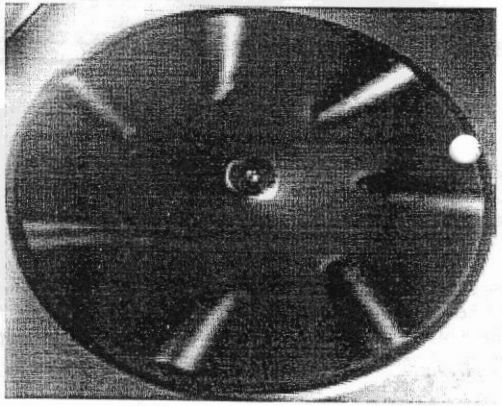


Figure 7. SPINNING DISK WITH SEVEN SOLITARY WAVES

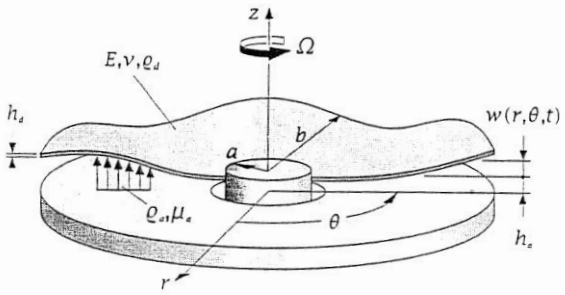
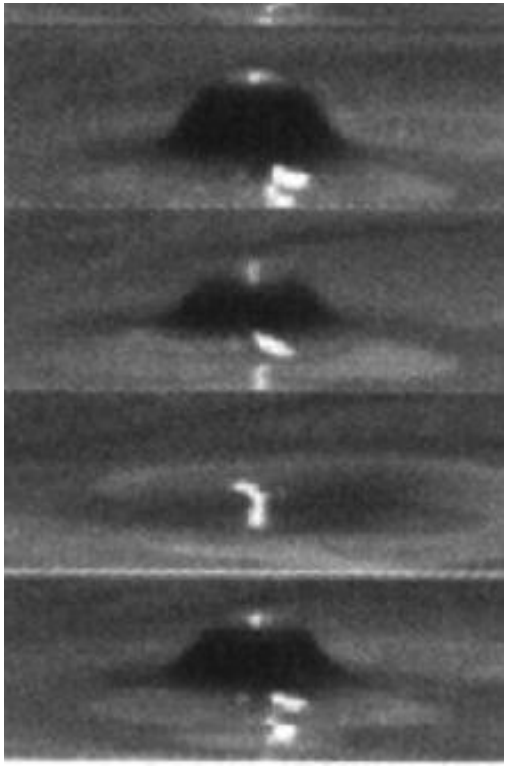
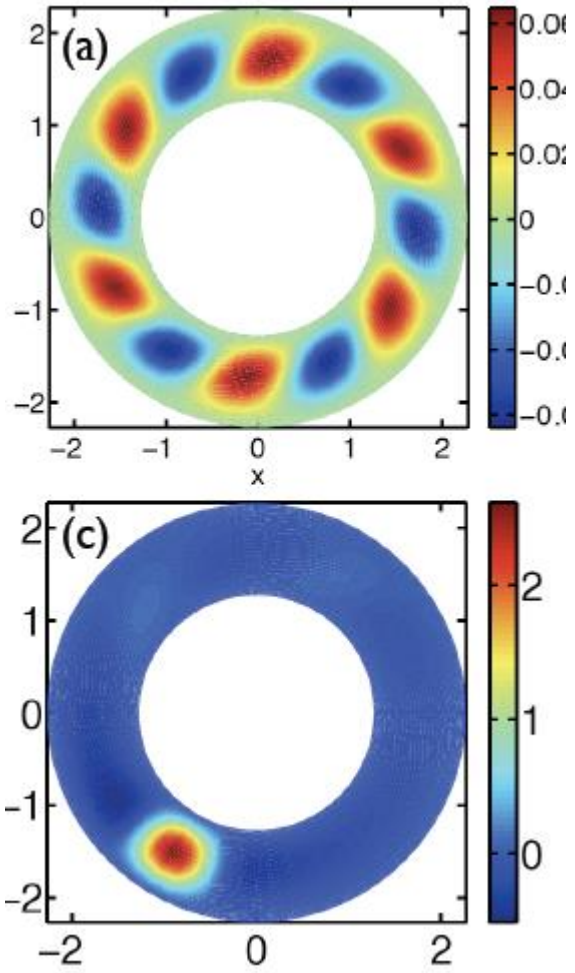


Figure 1. FLEXIBLE DISK SPINNING ON AN AIR-FILM NEXT TO A STATIONARY BACK-UP PLATE

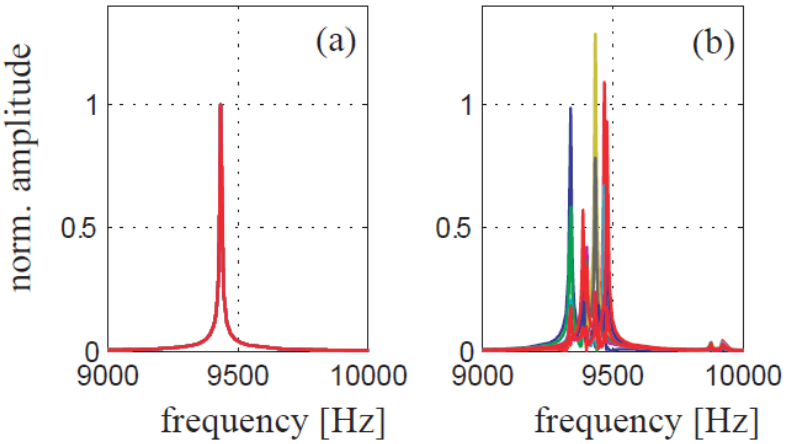
Periodische und solitäre Deformationszustände in rotierenden Scheiben.

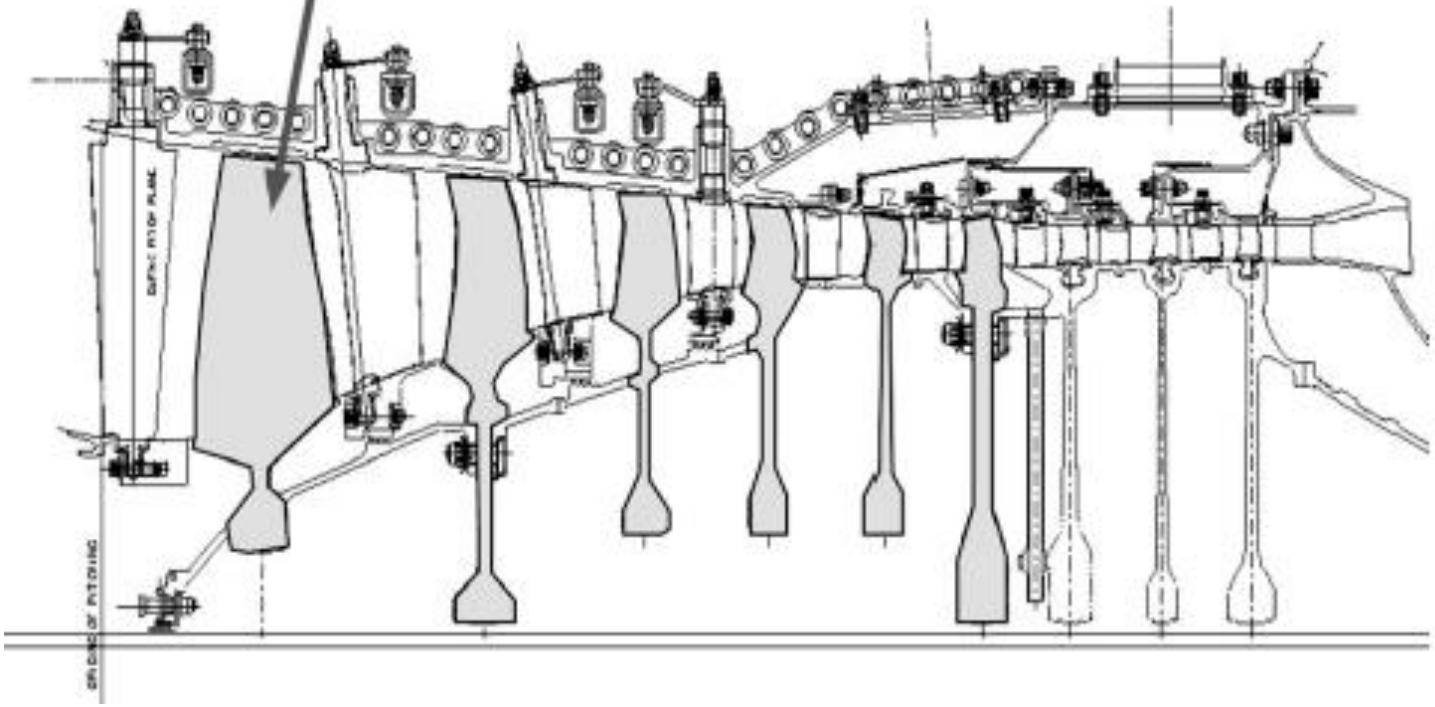
Oszillonen in Granularen Medien, Magnetofluiden, Elektrokonvektion



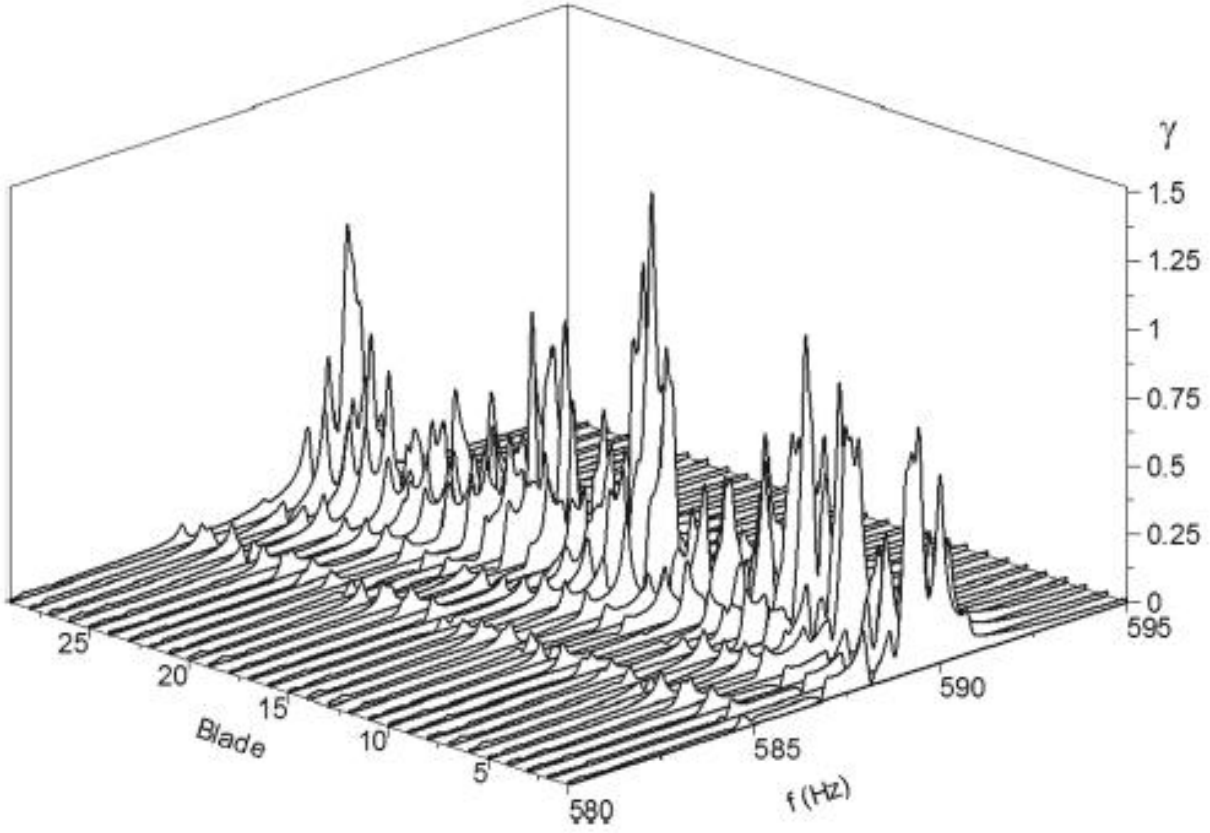


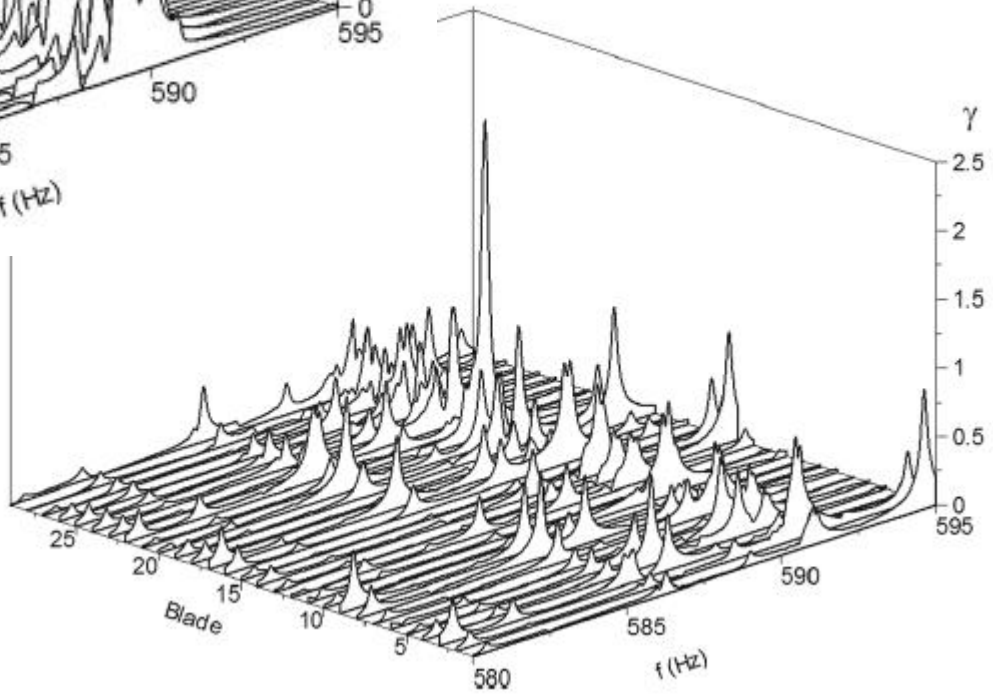
Stay tuned?





Stay tuned?


γ
1.5
1.25
1
0.75
0.5
0.25
0
595
590
585
580
f (Hz)
25
20
15
10
5
Blade


γ
2.5
2
1.5
1
0.5
0
595
590
585
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f (Hz)
25
20
15
10
5
Blade

Alle für Einen, Einer für Alle!

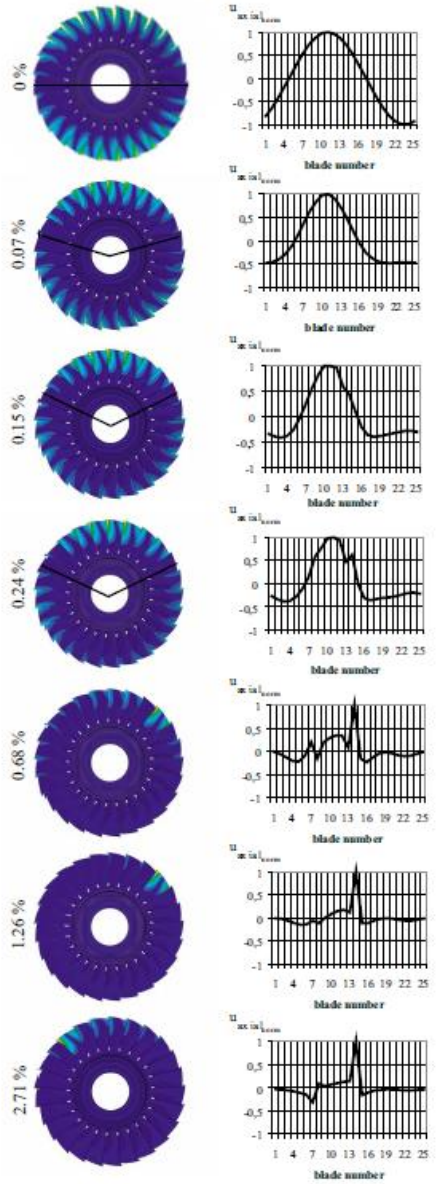


Fig. 8 Influence of different blade mistuning levels on vibration modes (first torsion modes, (M)CSMs 1; left: displacement amplitudes; right: normalized axial displacements at each leading edge blade tip)

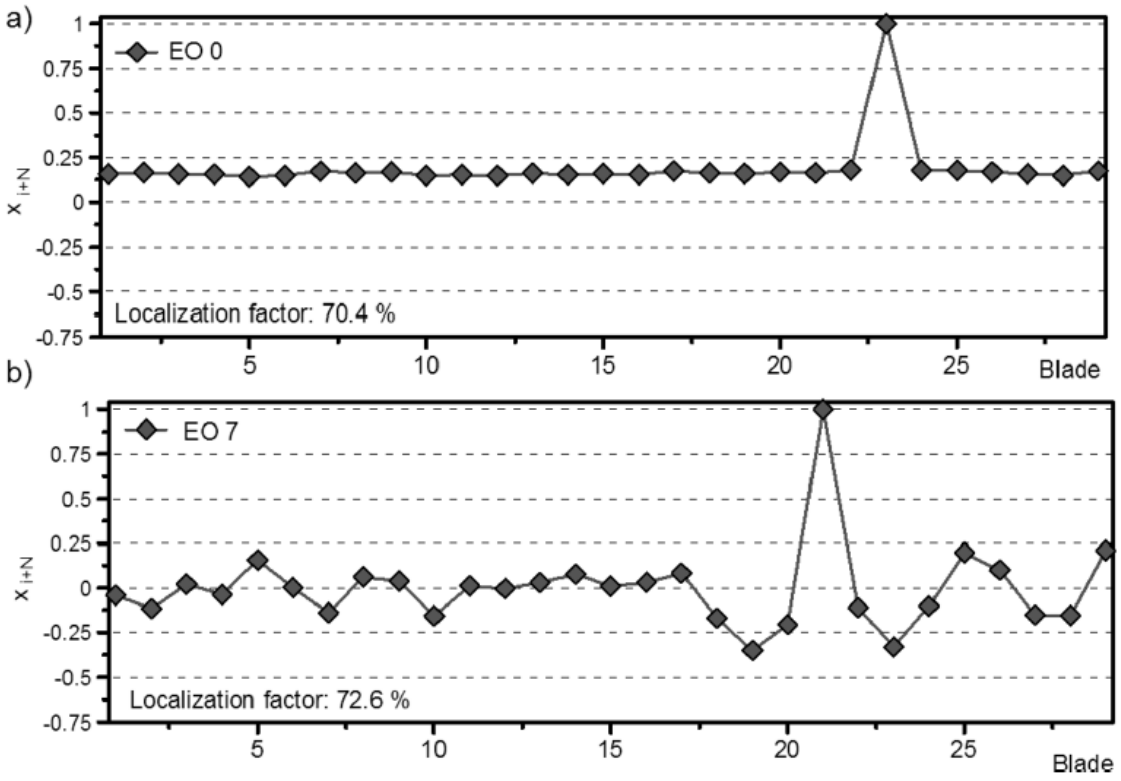


Fig. 12 Modes of vibration at maximum forced response (FSI not considered): (*a*) EO 0 / 1F and (*b*) EO 7 / 1F

It all started with.... **Philip Warren Anderson** in 1958?

PHYSICAL REVIEW VOLUME 109, NUMBER 5 MARCH 1, 1958

Absence of Diffusion in Certain Random Lattices

P. W. ANDERSON
Bell Telephone Laboratories, Murray Hill, New Jersey
(Received October 10, 1957)

This paper presents a simple model for such processes as spin diffusion or conduction in the "impurity band." These processes involve transport in a lattice which is in some sense random, and in them diffusion is expected to take place via quantum jumps between localized sites. In this simple model the essential randomness is introduced by requiring the energy to vary randomly from site to site. It is shown that at low enough densities no diffusion at all can take place, and the criteria for transport to occur are given.

I. INTRODUCTION

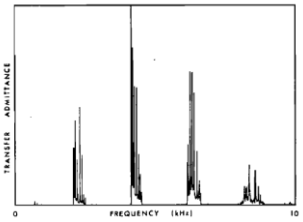
A NUMBER of physical phenomena seem to involve quantum-mechanical motion, without any par- reasonably well, and to prove a theorem about the model. The theorem is that at sufficiently low densities, transport does not take place; the exact wave functions

Vibration isolation from irregularity in a nearly periodic structure: Theory and measurements

C. H. Hodges and J. Woodhouse
Topexpress Ltd., 1 Portugal Place, Cambridge CB5 8AF, England

(Received 22 December 1982; accepted for publication 25 May 1983)

This article describes the theory and a simple experiment carried out to demonstrate the phenomenon of Anderson localization in an acoustical context. This is an effect whereby the propagation of vibration in a structure which is not entirely regular is impeded by the



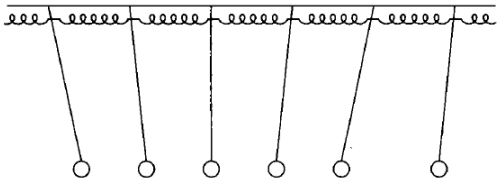


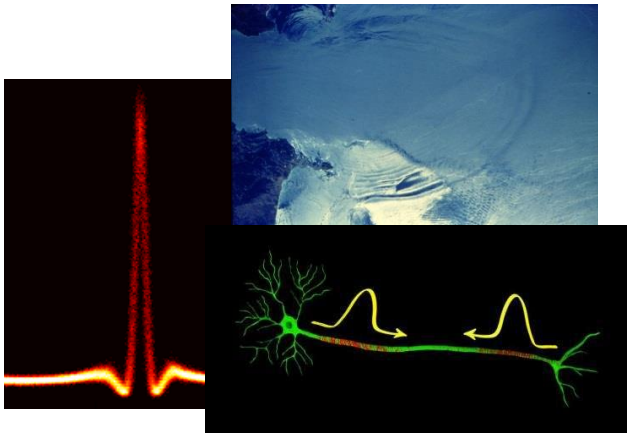
FIG. 1. Sketch of part of a chain of pendula coupled by springs.

Inhomogenitäten in linearen Systemen führen zu räumlicher Lokalisierung.

Eine andere Geschichte: Solitonen
Lokalisierte nichtlineare Wellen.

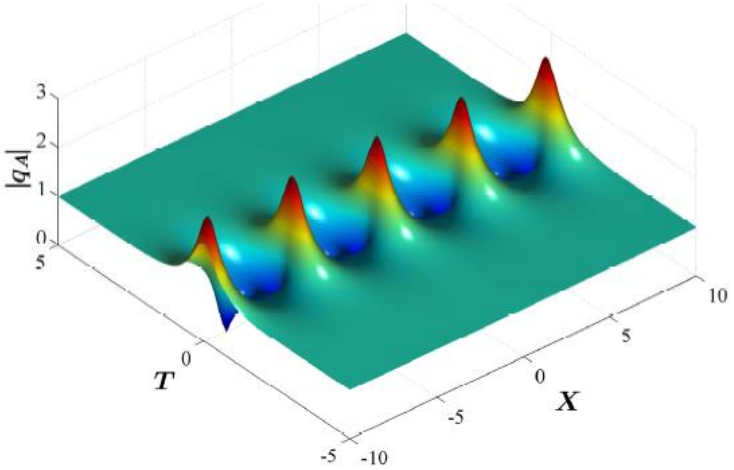
1834
John Scott Russell
beobachtet die
"wave of translation"
Geburtsstunde des Solitons.

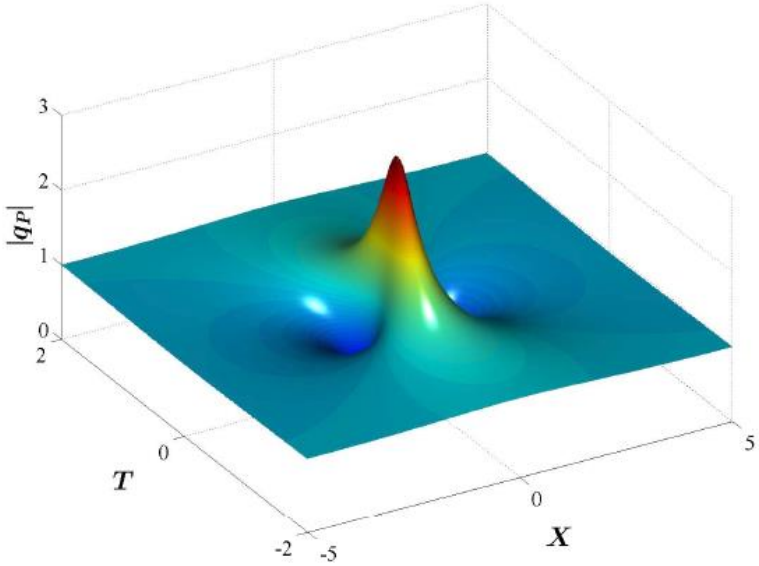
Heute:
Solitonen überall...

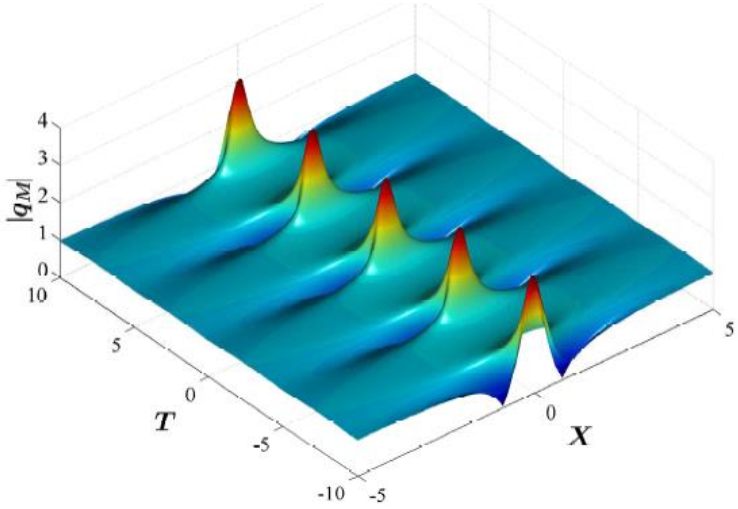


Nichtlinearität und Wellendispersion in Wechselwirkung.

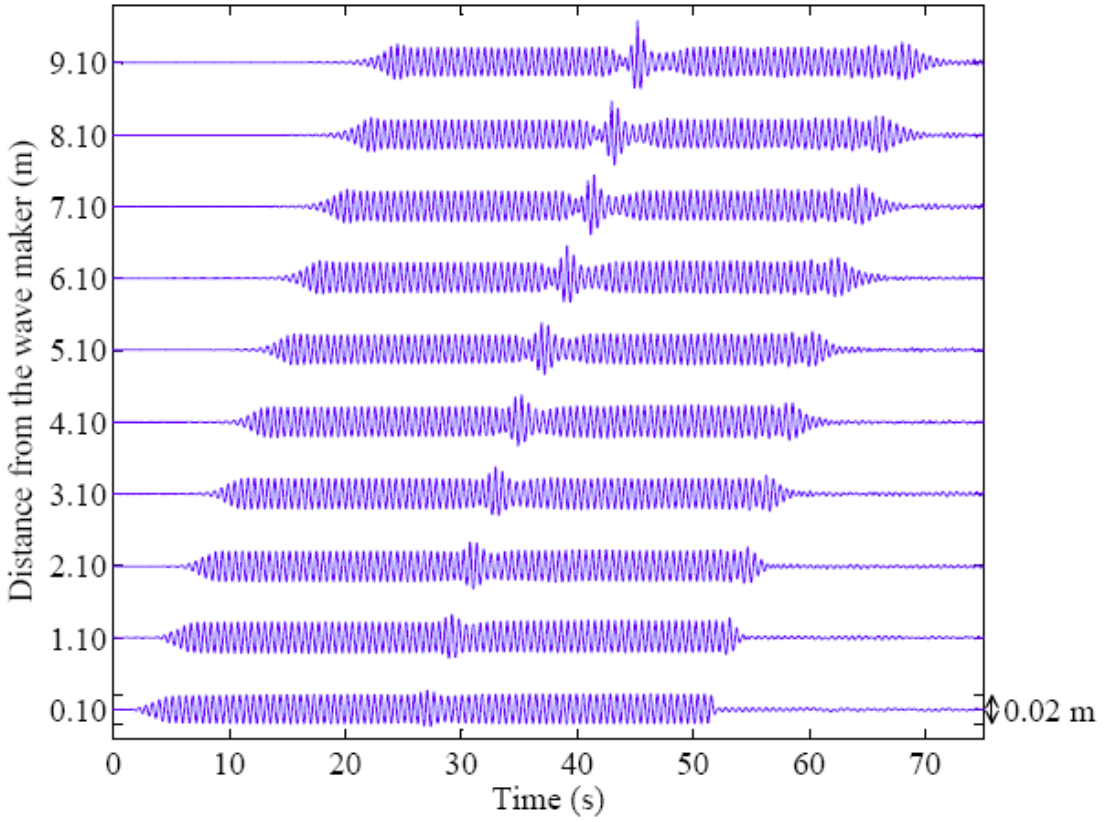
Seit 1980: Solitonen und (k)ein Ende:
Atmer, mit Lokalisation <u>in Raum und/oder Zeit</u>



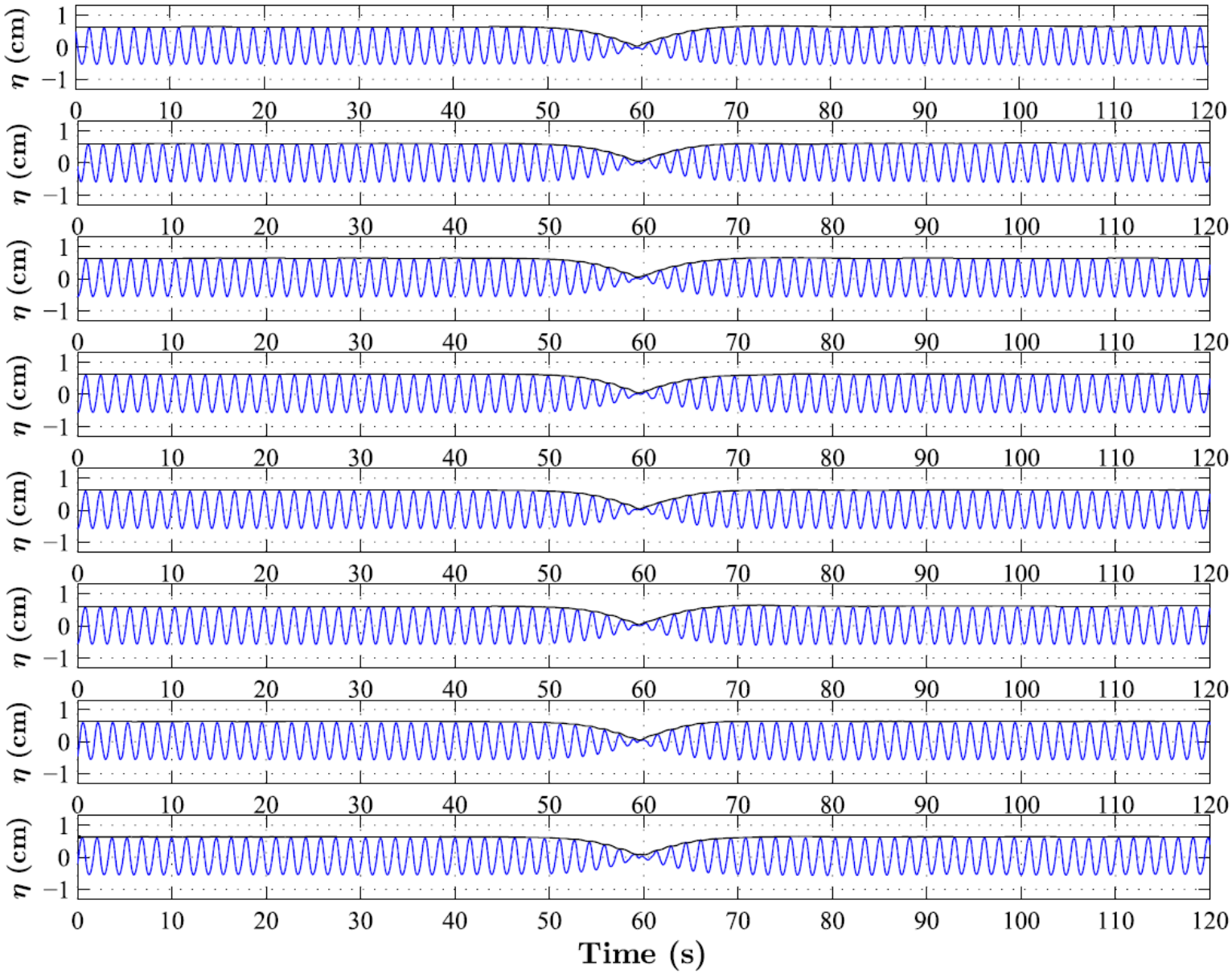




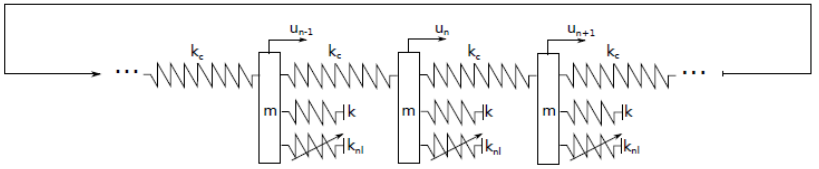
Wellenfokussierung 'aus dem Nichts'

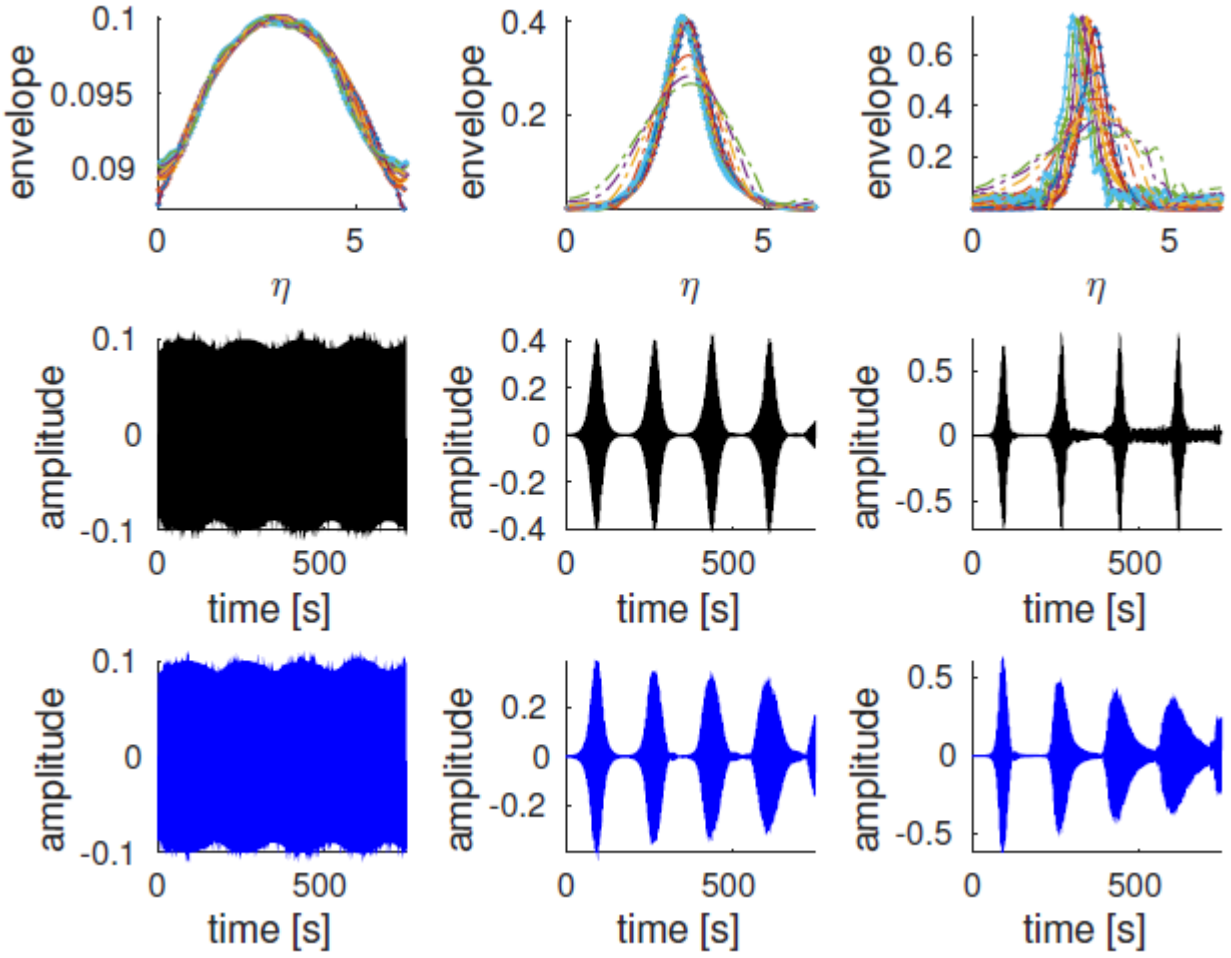


Dunkle Solitonen



Helle Solitonen in Schwingerketten - Driftende Wellenpakete





Amplitude über den Umfang

Auslenkung an einem Punkt über der Zeit

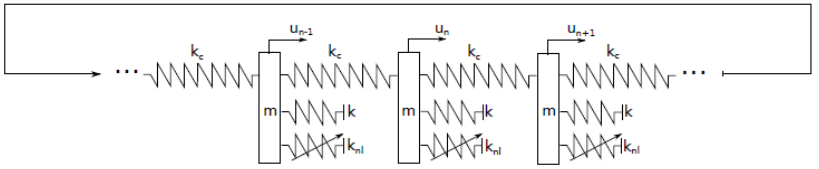
Lineares System zum Vergleich

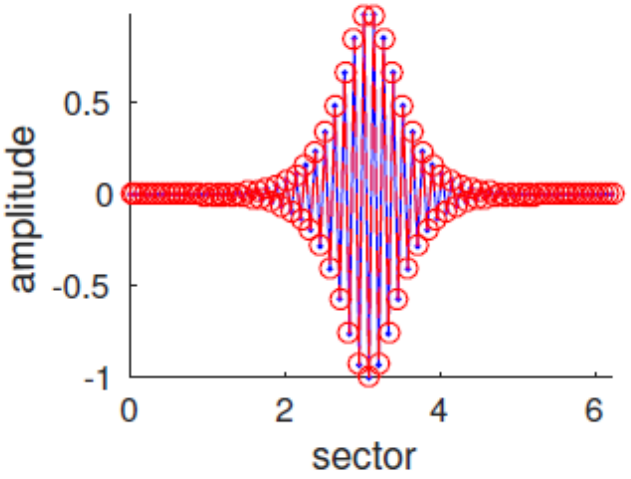
kleine

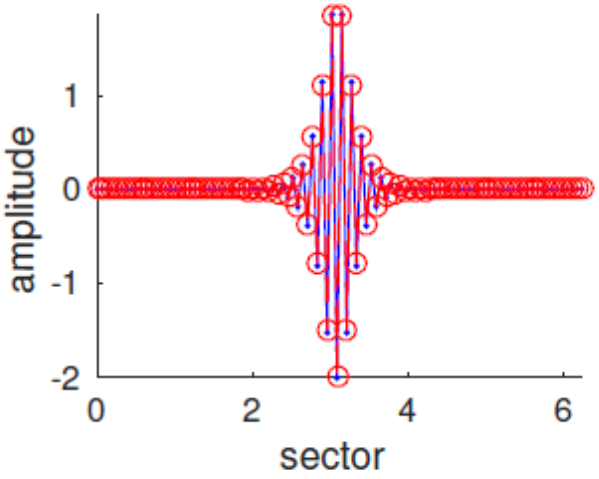
mittlere

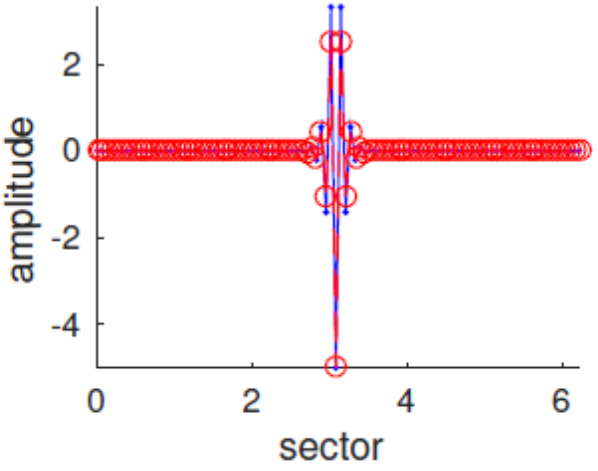
große Amplitude

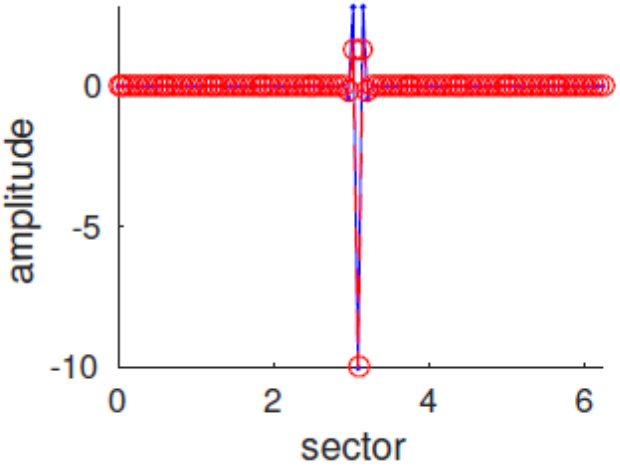
Intrinsisch Lokalisierte Moden, Diskrete Breather
In Periodischen Structuren



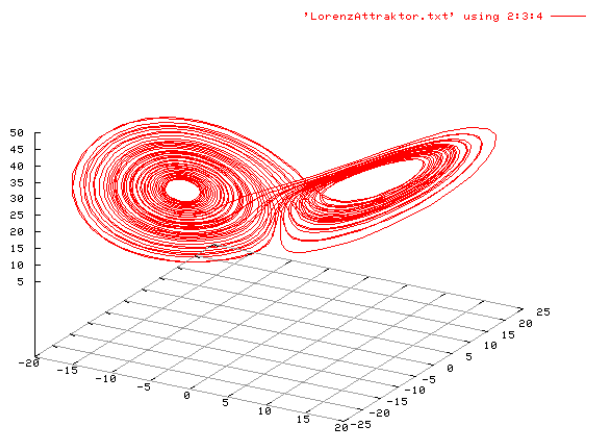




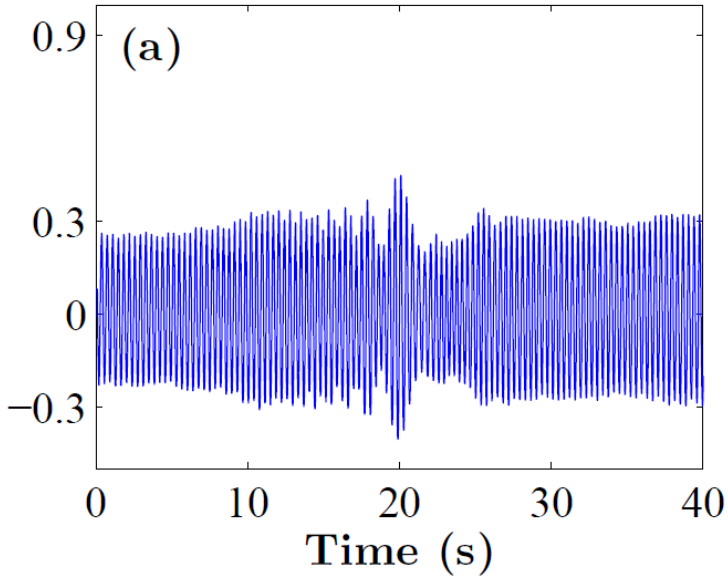




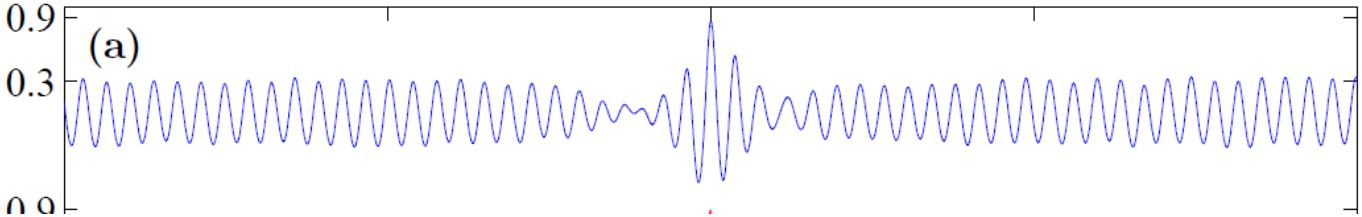
Und Chaos? Lokalisierung aus dem Rauschen.



Seltsamer
Attraktor



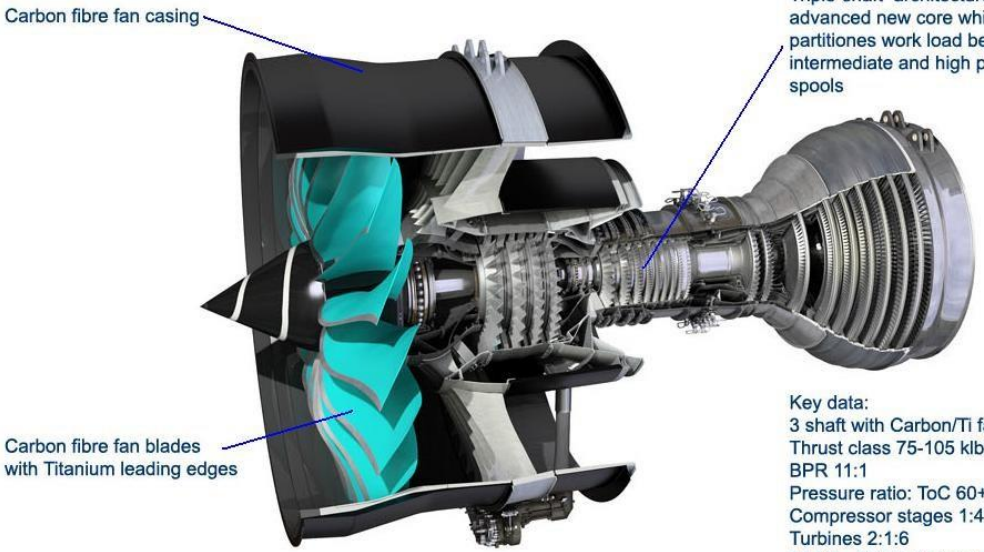
Chaotisches
Wellenfeld



Aus nichtlinearer Dynamik resultierendes lokales Ereignis.

Ausblick

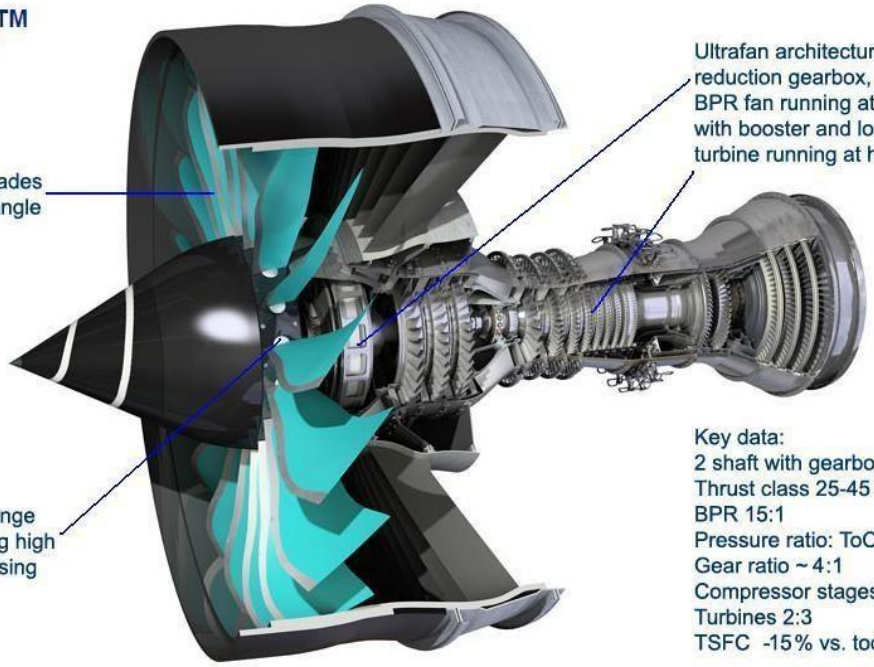
Advance



Key data:
3 shaft with Carbon/Ti fan
Thrust class 75-105 klbf
BPR 11:1
Pressure ratio: ToC 60+:1
Compressor stages 1:4:9
Turbines 2:1:6
TSFC - 5% vs. todays TXWB

Leeham Co EU

Ultrafan™



Key data:
2 shaft with gearbox
Thrust class 25-45 klbf
BPR 15:1
Pressure ratio: ToC 70:1
Gear ratio ~ 4:1
Compressor stages 1:3:9
Turbines 2:3
TSFC -15% vs. todays GTF

Will be equipped with low weight nacelle as thrust reverse is in engine

Leeham Co EU


Herzlichen Glückwunsch!
Aus London vom Vibration UTC!