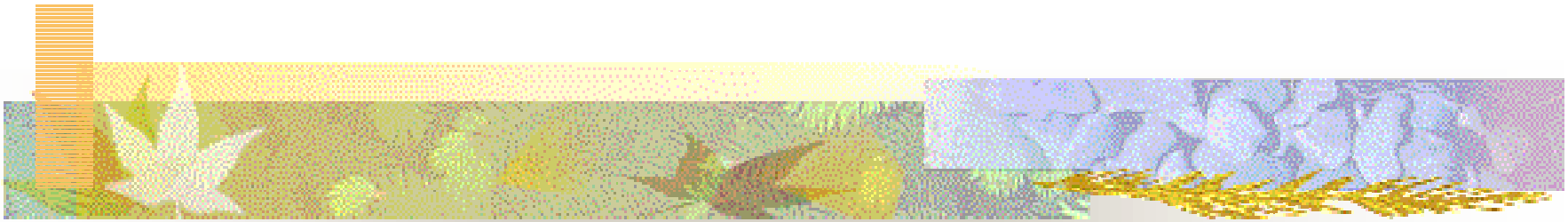
Warsaw ELHEP Group



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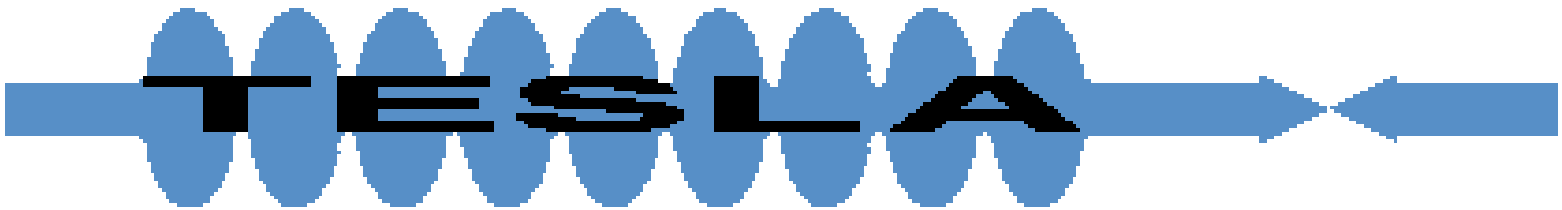


Institute of Electronic Systems, Warsaw University of Technology

Motivation

1. A Group of relevant professionals

- Highly organized, physicists and engineers, technicians, M.Sc., Ph.D., students
- Interdisciplinary, academia, industrial and governmental background
- Inter-university research group,
- With 10+Y experience in HEP experiments, Zeus and CMS

2. Relevant, demanding, TESLA tasks

Who we are?

- A Group of 30+ scientists, physicists and engineers, technicians, M.Sc. And Ph.D. students specializing in photonics and electronics for HEP experiments;
- Academia, industrial and governmental background
- Experience in Zeus and CMS experiments, European Programs

ELHEP offers its experience for TESLA

Human Resources – schedule of involvement increase

- Permanent members in DESY (now 3 persons, soon 5)
- Permanent team extension, up to 10-12 persons during a year
- Sister laboratory in Warsaw, supporting ELHEP/DESY (up to 10-12 persons), with frequent work visits to Hamburg

ELHEP Work Organization (a year from now)

- **ELHEP-TESLA Team in DESY**
  (possibly 10-12 permanent young researchers – physicists and engineers)

- **ELHEP-Warsaw Team**
  Warsaw Sister Laboratory, IES.WUT based, supporting and backing activities in DESY, 6 senior members+10-12 young researchers

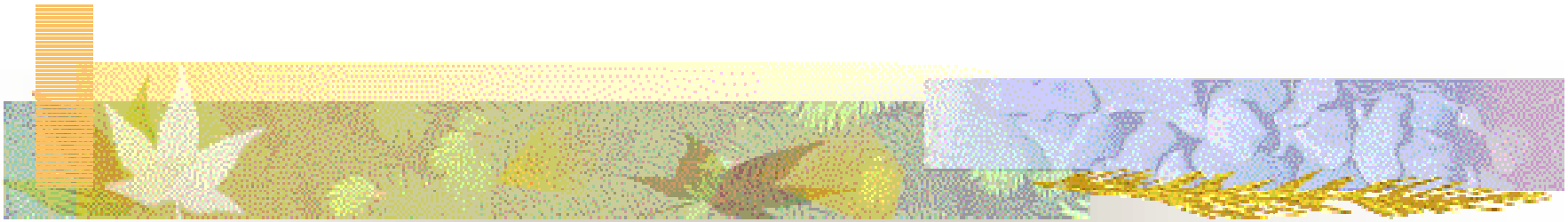
Needed technical resources in DESY

- **PERMANENT LABORATORY**
- Now we are located in an adjacent barrack to the Tesla Control Room
- Basic laboratory equipment, software, FPGA test and development environment (hardware and software)
- **Fast communications between Warsaw and Hamburg (video-teleconferencing facilities)**

Needed technical resources in Warsaw
(the idea of sister laboratory)

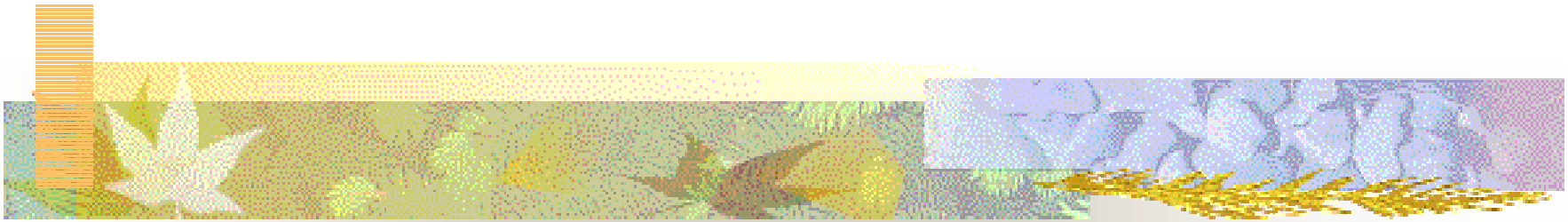
- **SISTER LABORATORY**
- Laboratory space at IES-WUT and at IEP-WU
- Basic laboratory equipment, software, FPGA test and development environment (hardware and software) – DESY support would be asked
- Fast communications between Warsaw and Hamburg (video-teleconferencing facilities)

ELHEP Tasks for TESLA (NOW)



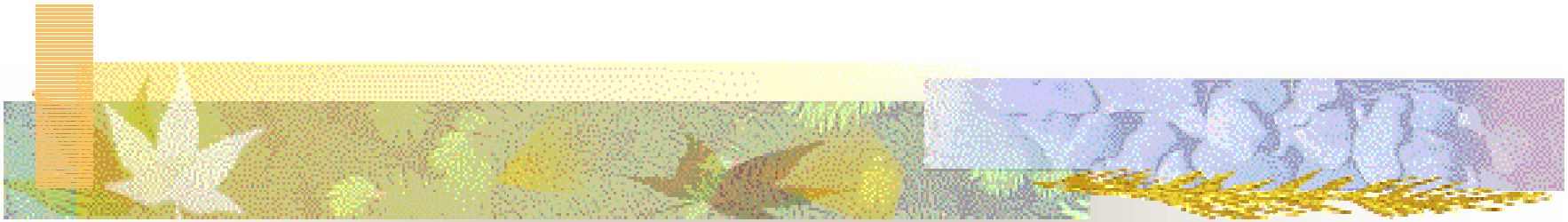
1. **Control System**
2. **Radio Frequency System (HP+LL)**
3. **Data Readout +DAQ**
4. **Beam Diagnostics and Instrumentation**

ELHEP Tasks for TESLA (future)



1. **Detector**
2. **Physical experiments**

ELHEP Tasks for TESLA (what we are doing NOW)



1. **Low Level Radio Frequency Control**
2. **Building relevant organizational structure, including: people, place and hardware**

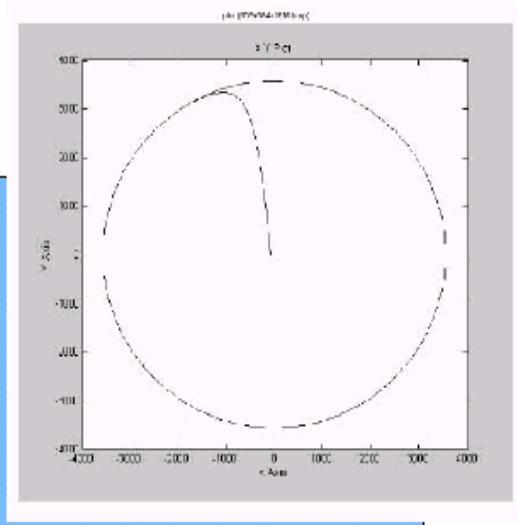
LLRF Control Tasks - **FPGA/DAQ approach**

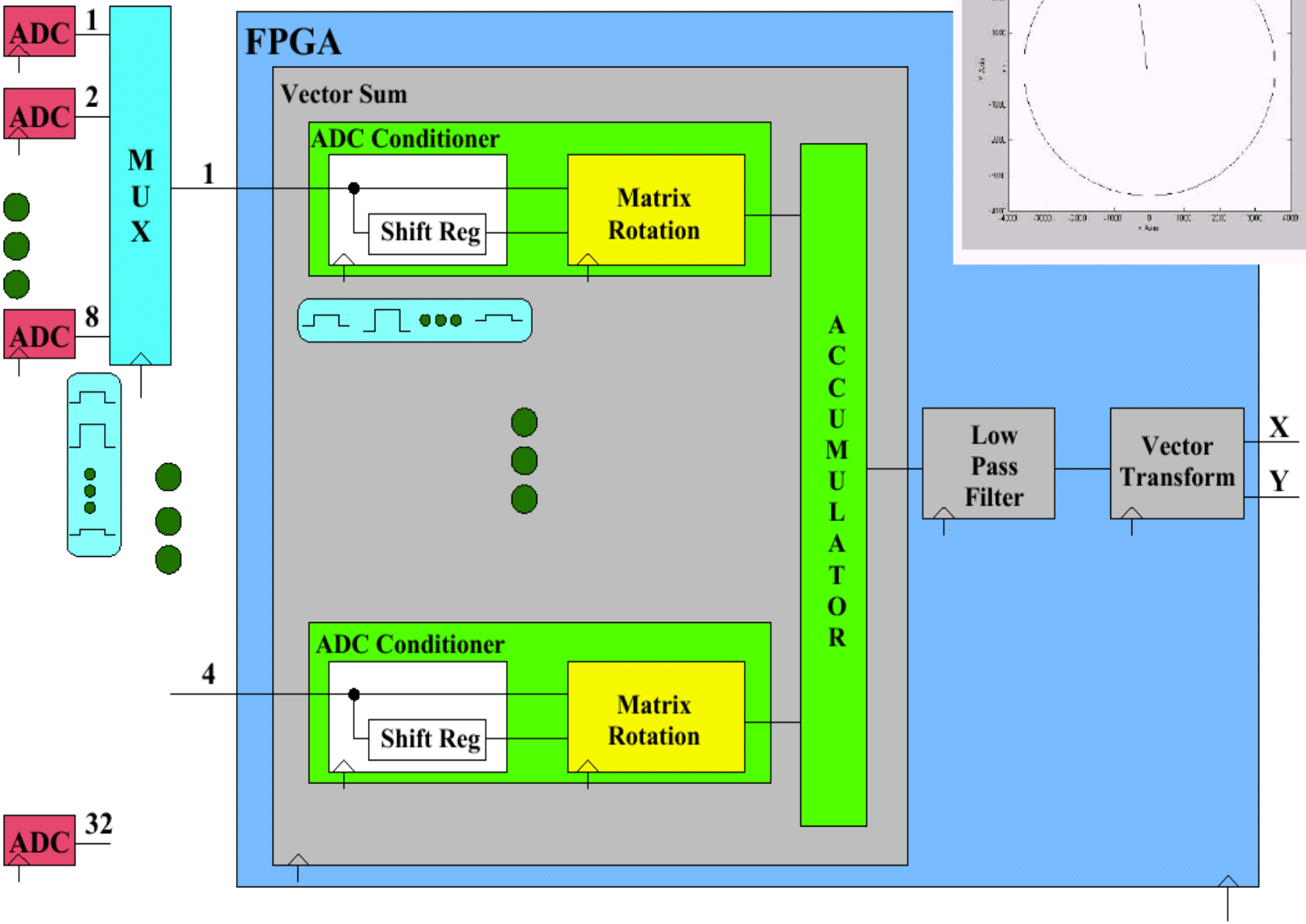
- Control loop modeling and realization (including cavity simulation)
- High definition language and FPGA/DSP
- “Behind the tunnel” tests – Control demonstrations at the TTF
- Test board supplemented with analog multiplexer to serve 8 cavities and additional channels
- Exceptions handling problems
- Decision on dedicated test board design and fabrication

Data Readout, Acquisition and Processing Tasks

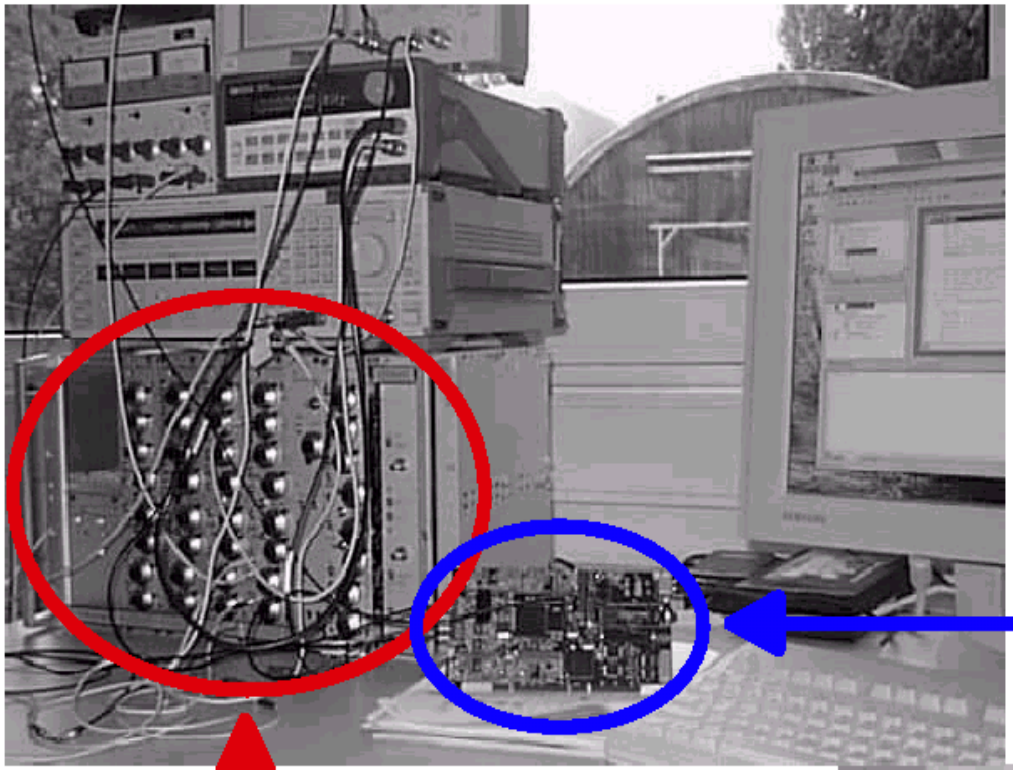
- Electro Optical Sampling
- Cavity Probe Signals – efficient calculations during dead-time of the system

RF_Controller - how it is constructed and simulated in Matlab now

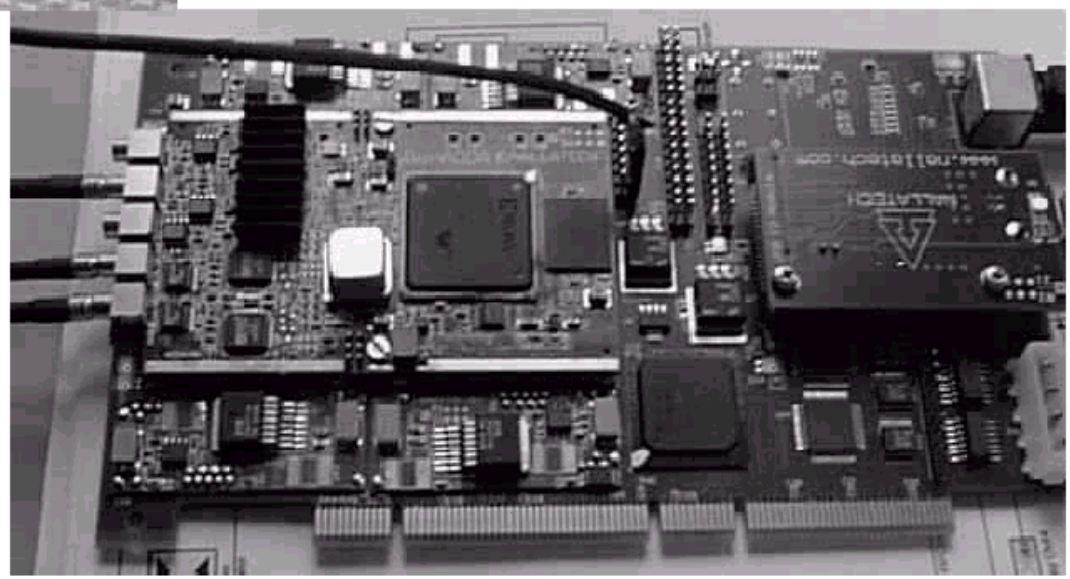




RF_Controller - how it is tested now



Xilinx demo board
(with Virtex II XC2V3000)



Cavity simulator

TESLA International Infrastructure and Publicity/Lobbying

Publications, conferences, education, publicity, information in Poland, justification of broad involvement in TESLA with a considerable number of young people

- Annual Conference of ELHEP, 2003 on TESLA
- Special journal issues on TESLA – ELEKTRONIKA in 2003
- TESLA & and HEP Exp. Electronics Lectures

SUMMARY
General aims of cooperation

- **Effectively participate in making TESLA a reality**
- **Savings in: time, money, space, labor and workforce, resources**
- **Attracting young, gifted people to TESLA**
- **Building a strong TESLA oriented laboratory in Warsaw**

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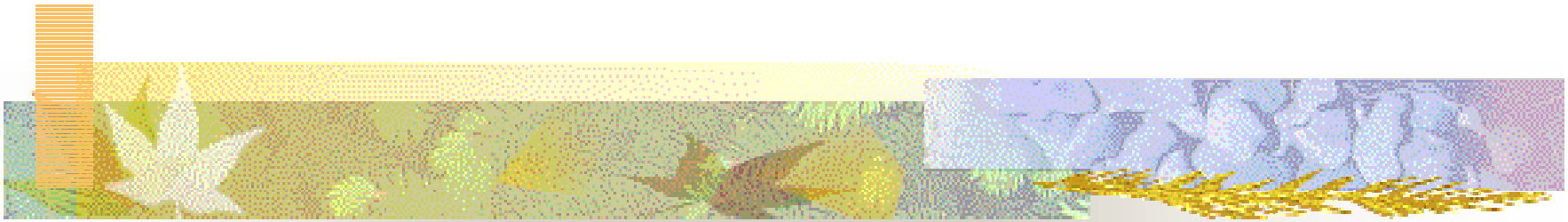
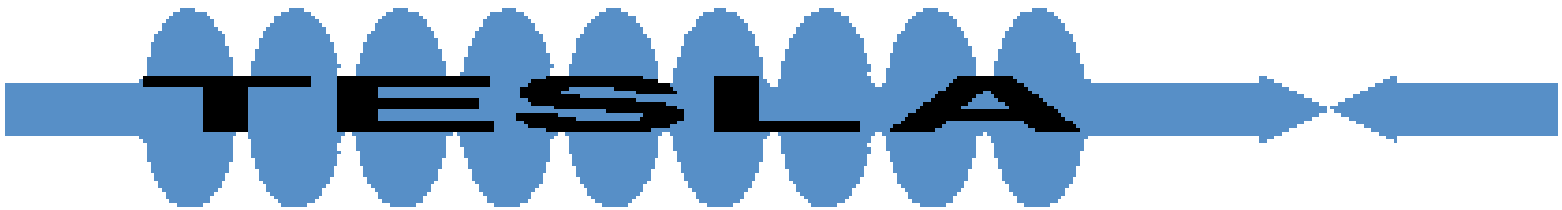


for 

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