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2nd ECFA/DESY Study on Physics and Detectors for a Linear Electron-Positron Collider

LAL - Orsay - France, April 5-7, 1998

Date : April 5, 1998 - 17:10

Speaker : D. Miller

Goals and organisation of the study.
Charges to the working groups.

GOALS AND ORGANISATION OF 2ND ECFA/DESY STUDY ON PHYSICS & DETECTORS FOR A LINEAR COLLIDER.

DAVID MILLER FOR ORGANISING COMMITTEE.

DELIVERABLES :-

(1) PHYSICS FEASIBILITY STUDIES FOR LCWS '99 (SITGES, SPRING 199

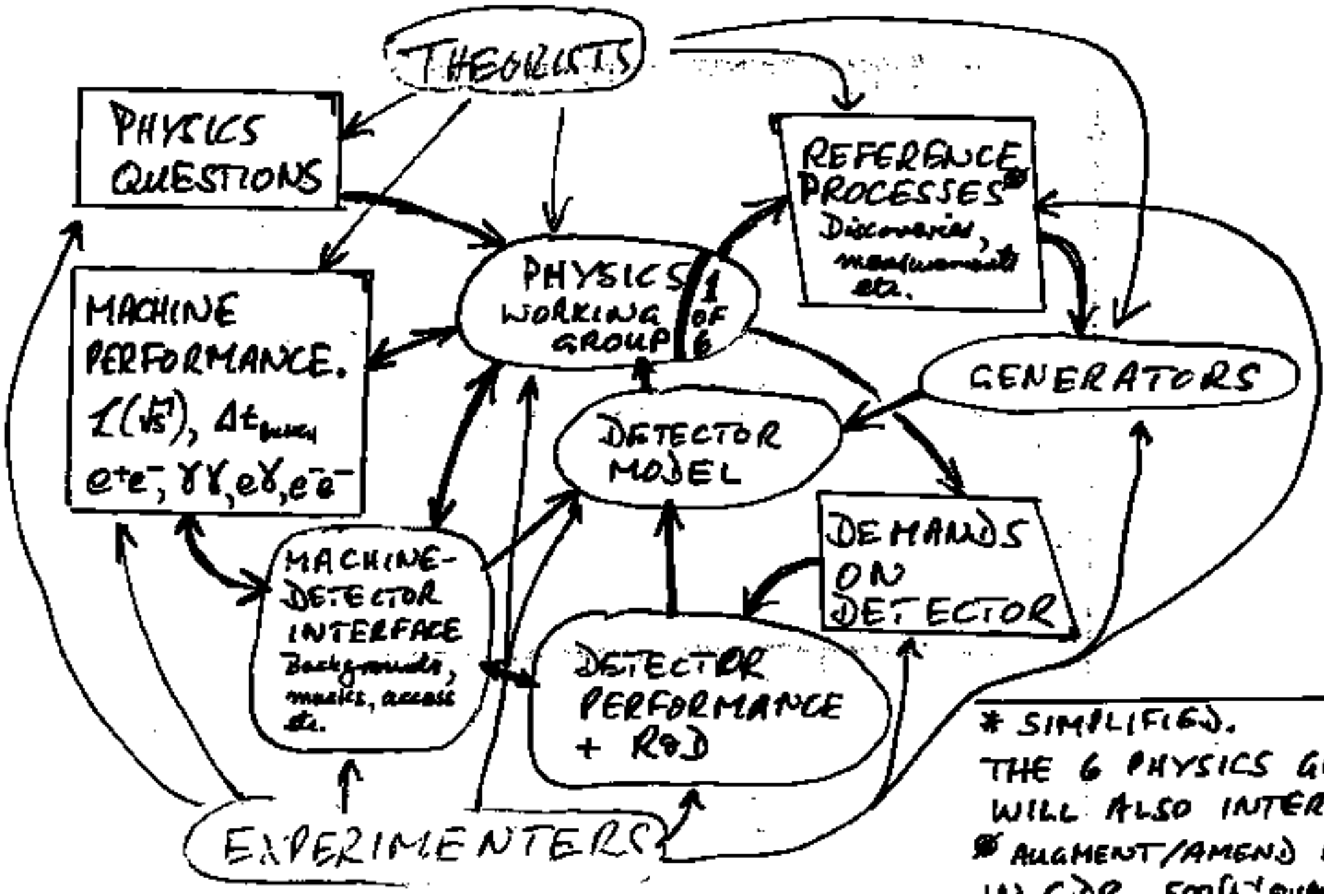
(1a) REPORTS ON DETAILED WORK PRESENTED AT WORKSHOPS ; IN DESY 123F

(2) INPUT IN 2000 TO TESLA TECHNICAL DESIGN REPORT:

a) PHYSICS PROGRAMME.

b) COSTED DETECTOR DESIGN.

RELATIONS* BETWEEN GROUPS



* SIMPLIFIED.
THE 6 PHYSICS GROUP
WILL ALSO INTERACT.
@ AUGMENT/AMEND LIST

PHYSICS WORKING GROUPS

TASKS

1. TO IDENTIFY POSSIBLE PHYSICS GOALS (DOES $\mathcal{L}=5\times10^{34}$ EXTEND THE LIST?)
2. TO PICK OUT A FEW OF THEM

   WHICH ARE a) IMPORTANT

   AND/OR b) DEMANDING
3. TO DO THOROUGH FEASIBILITY STUDIES ON THEM, WITH GOOD GENERATORS + THE STANDARD DETECTOR MODEL.
4. TO JUDGE THE IMPORTANCE AND SENSITIVITY OF RUNNING AT DIFFERENT ENERGIES (91 TO ~1000 GeV).
5. TO JUDGE THE IMPORTANCE FOR PHYSICS OF THE $\gamma\gamma$, $e^-\gamma$, e^-e^- OPTIONS.
6. TO IDENTIFY THE LIMITATIONS OF THE STANDARD DETECTOR AND TO ADVOCATE IMPROVEMENTS.

TOMORROW — START ON 1.→2. ABOVE
— DECIDE WHO DOES WHAT
AND WHO ELSE IS NEEDED.
— START TO PLAN WORK
(INCLUDING JUNE WORKSHOP PRESENTATION

GROUP CONVENERS (SO FAR)

TOP QUARK PHYSICS

EXPERIMENT: MANEL MARTINEZ, RAMON MIQUEL
THEORY: JOHANN KÜHN, WERNER BERNREUTER

QCD, INCLUDING PHOTON STRUCTURE

EXPERIMENT: PHIL BURROWS, ALBERT de ROECK
THEORY: still inviting people (3 cantaker?)
Marie Grew

HIGGS

EXPERIMENT: EILAM GROSS, SIJBRAND DE JONG
ALEX READ
THEORY: ABDEL DJOUADI, BERNDT KNIEHL

SUSY

EXPERIMENT: GRAHAM BLAIR, ULI MARTYN?
YVES SIROI
THEORY: ALFRED BARTL,
WALTER MAJEROTTO

ELECTROWEAK GAUGE THEORIES.

EXPERIMENT: KLAUS MOENIG
THEORY: THORSTEN OHL, GEORGE GOUNARIS

ALTERNATIVE THEORIES.

EXPERIMENT: GRAHAM WILSON
THEORY: REINHOLD RÜCKL

UNDERLINED IF ON
1 APRIL ORSAY LIST

CONVENERS (CONTINUED)

GENERATORS + STANDARD PROCESSES

EXPERIMENT: HYWEL PHILLIPS

THEORY: MIKE SEYMOUR, STASEK JADACH

DETECTOR SIMULATION

MARTIN POHL, GRAHAM BLAIR

DETECTOR PERFORMANCE + R&D

RON SETTLES, CHRIS DAMERELL, SERGIO BERTOLUCCI

MACHINE-DETECTOR INTERFACE

MARTIN LEENEN, OLIVIER NAPOLY, NICK WALKER, JON BUTTERWORTH

GENERATORS + STANDARD PROCESSES GROUP

SUGGESTED TASKS FOR TOMORROW :-
(PLEASE ADD MORE)

1. REVIEW C&R STANDARD PROCESSES.
2. COLLECT INPUT FROM MORNING PHYSICS GROUPS.
3. IDENTIFY GAPS IN AVAILABLE GENERATORS
4. DECIDE WHO DOES WHAT, AND WHO ELSE IS NEEDED
5. PLAN WORK — URGENT (BY JUNE)
   — LONGER TERM (BY NOVEMBER etc.
6. SUGGESTIONS FOR JUNE PARALLEL SESSION.

DETECTOR MODELLING GROUP

SUGGESTED TASKS FOR TOMORROW (PLEASE ADD MORE!)

1. REVIEW AVAILABLE TOOLS (INCLUDING BACKGROUND GENERATORS)
2. DECIDE LEVEL OF MODELLING FOR REFERENCE REACTION FEASIBILITY STUDIES.
3. ASK IF DETECTOR PERFORMANCE IS SUFFICIENTLY DEFINED? (ABOUT CHANGE FROM REFERENCE DETECTOR)
4. IDENTIFY WHAT CAN BE DONE SOON, TO GET PHYSICS STUDIES GOING
5. LOOK FOR PEOPLE TO DO THE WORK

DETECTOR PERFORMANCE + R&D GROUP

TASKS (ADD MORE?)

1. REVIEW REFERENCE DESIGN (ESPECIALLY FOR $\mathcal{L} = 5 \times 10^{34}$)
2. INVITE REPORTS ON EXISTING R&D PROGRAMMES.
3. IDENTIFY NEEDS FOR NEW R&D (INCLUDING TRACKER AND READOUT
4. CONSIDER MODIFICATIONS TO REFERENCE DESIGN, IN THE LIGHT OF — PHYSICS DRIVEN
   — NEW TECHNIQUES
5. LOOK AT ALTERNATIVE DETECTOR STRATEGIES (eg. SNOWMASS, JLC)

JOBS FOR TOMORROW (ADD MORE?)

- LIST KNOWN R&D PROGRAMMES AND SET UP PRESENTATIONS FROM THEM AT JUNE WORKSHOP (PLUS SNOWMASS? JLC DESIGNS?)
- IDENTIFY POSSIBLE WEAKNESSES IN REFERENCE DESIGN, AND FIND VOLUNTEERS TO STUDY THEM
- MAKE A FIRST LIST OF R&D NEEDED

MACHINE-DETECTOR INTERFACE GROUP

TASKS (PLEASE ADD)

1. TO STUDY BACKGROUNDS, AND HOW TO REDUCE (e.g. MASKS, COLLIMATORS) OR LIVE WITH THEM
   ↳ (MONTE CARLO GENERATORS FOR PHYSICS STUDIES)
2. TO LOOK AT CONSTRAINTS FROM M/C ON DETECTOR POSITIONING AND RAD-HARDNESS.
3. TO EXPLORE BEAM DIAGNOSTICS, LUMINOSITY MEASUREMENT, ABSOLUTE MOMENTUM MEASUREMENT.
4. TO FEED BACK PHYSICS CONSTRAINTS TO MACHINE DESIGN (e.g. δp, CROSSING ANGLE, NEED FOR REAL $\gamma\gamma$ ETC.)

TOMORROW

- PLAN THE WORK ON ALL OF THESE
- WHAT IS MOST URGENT?
  e.g. GENERATORS FOR BACKGROUND AT 5×10^{34}

* LONGER TERM MAY WANT SPECIAL $\gamma\gamma$-COLLIDER W.G. ?

NO TUNNEL-VISION !

a) CO-ORDINATE WITH USA & JAPAN.

WE ARE NOT A PROTO-COLLABORATION.

LCWS WILL BE A WORLD MEETING,
BUT THERE SHOULD BE EXCHANGES
BEFORE AND AFTER (AND WITH μ⁺μ⁻ PEOPLE).

b) THE REFERENCE-DETECTOR IS FOR NOW
IT'S WHOLE SHAPE CAN BE CHANGED LATER
— BUT WE NEED SOMETHING DEFINITE
TO DO FEASIBILITY STUDIES WITH.
(IS ONE DETECTOR ENOUGH ?)

c) ALL GROUPS MUST THINK ABOUT
$\gamma\gamma$, $e\gamma$, e^-e^- AS WELL AS e^+e^-.
MUST HAVE SURVEYS OF THEM IN JUNE
AND/OR NOVEMBER. (PROGRESS SINCE
MY REVIEW AT LCWS MORIOKA !!)
SHOULD REAL γ BE PART OF
BASIC PROGRAMME? AT STARTUP?

d) PHYSICS WORKING GROUPS SHOULD
HAVE JOINT SESSIONS AND SHARE
SOME TOPICS/PROCESSES/CHANNELS.