



France Japan Particle Physics LAPTh view

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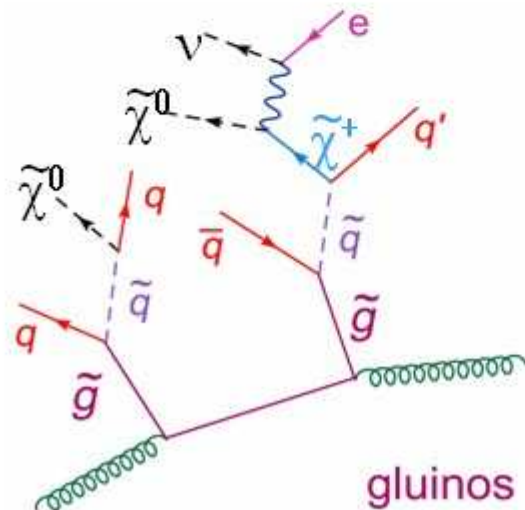
New Technique for Calculating Amplitudes

J. Kodaira (KEK) at Annecy

Computational Point of View

1. Loop Calculation (Precision)
2. Multi – Leg Amplitude (Background)
ex. Gluino

Cascade Decay to Light (SM) Particles

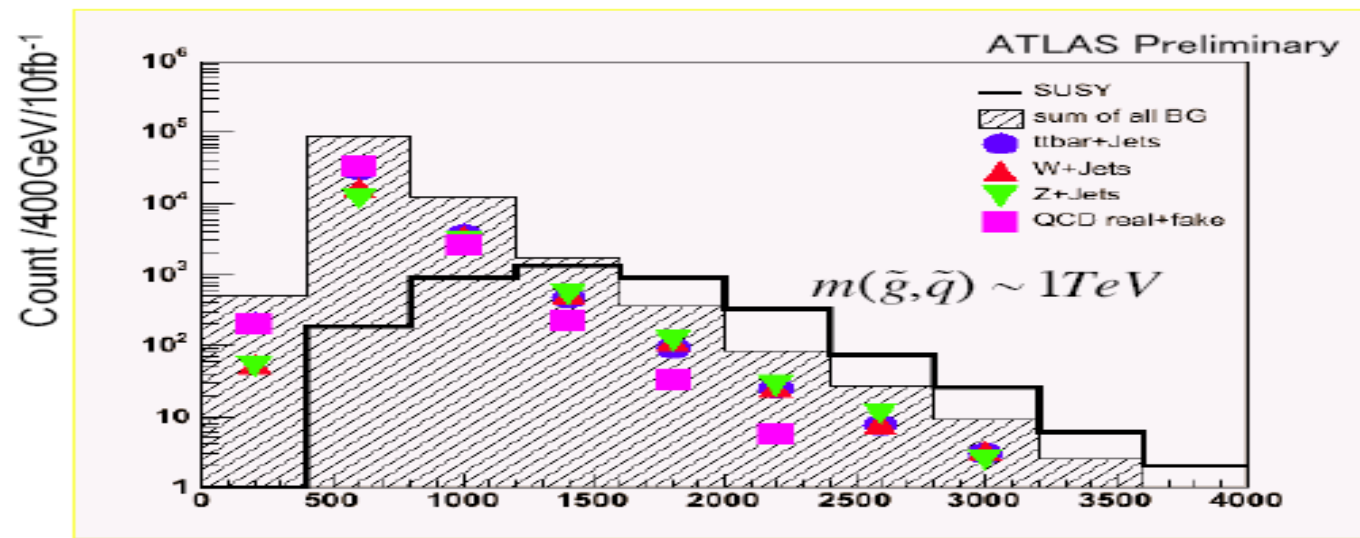


Backgrounds (and many **signals**)
require detailed
understanding of **scattering**
amplitudes for
many ultra-relativistic ("massless")
particles
– especially **quarks** and **gluons** of
QCD

Result (1)

No lepton mode

Asai, ATLAS Japan



$$\text{Effective Mass (GeV)} = m_{\tilde{g}, \tilde{q}} + \sum P_T(4\text{jets})$$

- (1) Background increases **by factor 2–4** than the PS prediction depending on M_{eff} .
- (2) Slope becomes more gentle, and **similar to the signal** ← **important Point**
- (3) All BG contributions are the same order. Not easy to understand BG using real data.
→ see Next Page.

6

Conclusion

[1] Backgrounds for SUSY search are estimated with the Matrix Element information.

- (1) The background increases by factor 2–4
- (2) Shape of Background becomes similar to signal.
→ BG estimation using real data is essential. We need to understand slope of distributions.
- (3) W/Z+Njets studies @ Tevatron give good information for us.
- (4) QCD multijet contributions are the same order of the other background processes: need more careful treatment.
→ Missing E_T is vital business.

Ingredients for NLO for M external legs

- ◆ *Most difficult:* One-loop RC to the M-leg partonic subprocess (Grace-loop)
- ◆ Tree-level to M+1-leg partonic subprocess (GRC4F for LEP2 big success, GRAPPA for LHC)
- ◆ Efficient method to merge real and virtual, cancel IR (OK)
- ◆ Parton shower at NLO (merging)

Many of these steps handled by France-Japan Coll. and were being improved and optimized with Kodaira-san (QCD),

Need for automatisatisation,...

Early papers/France-Japan Collaboration

Collaboration started in 1992

Lepton pair productions with double hard photon emission

J.Fujimoto (KEK, Tsukuba) , T. Kaneko (Meiji Gakuin U.) , Y.Kurihara (KEK, Tsukuba) , D. Perret-Gallix (Annecy, LAPP) , Y.Shimizu (KEK, Tsukuba) .

Feb 1993. Phys.Lett.B304:189-192,1993.

Jets in photon-photon collisions: from TRISTAN to J/N-LC.

P. Aurenche, J.P. Guillet (Annecy, LAPP) , M. Fontannaz (Orsay, LPT), Y. Shimizu, J. Fujimoto (KEK, Tsukuba) , K. Kato (Kogakuin U.) .

Dec 1993. Prog.Theor.Phys.92:175-188,1994.

GRC4F

Grc4f v1.1: A Four fermion event generator for $e^+ e^-$ collisions.

J. Fujimoto, T. Ishikawa (KEK, Tsukuba) , T. Kaneko (Meiji Gakuin U. & Annecy, LAPP) , K. Kato (Kogakuin U.) , S. Kawabata, Y.Kurihara (KEK, Tsukuba) , T. Munehisa (Yamanashi U.) , D.Perret-Gallix (Annecy, LAPP) , Y. Shimizu (KEK, Tsukuba) , H. Tanaka (Rikkyo U.) .

May 1996. Comput.Phys.Commun.100:128-156,1997.

Myself alone 21 publications with Japanese colleagues

Full 1-loop RC available for 2->3 and 2->4

$$e^+e^- \rightarrow \nu\bar{\nu}H \quad (1350)$$

GRACE, PLB554(2003)251

Denner et al., NPB660(2003)289

$$e^+e^- \rightarrow t\bar{t}H \quad (2327)$$

GRACE, PLB571(2003)101

You et al., PLB571(2003)85

Denner et al., PLB575(2003)290

$$e^+e^- \rightarrow ZHH$$

GRACE, PLB578(2004)161

(5417) Zhang et al., PLB578(2004)349

$$e^+e^- \rightarrow e^+e^-H \quad (4470)$$

GRACE, PLB590(2004)33

$$e^+e^- \rightarrow \nu\bar{\nu}\gamma \quad V = V_\mu, V_e$$

GRACE, NIM A334(2004)334

$$e^+e^- \rightarrow \nu\bar{\nu}HH \quad (19638)$$

GRACE, hep-ph/0505104

$$e^+e^- \rightarrow \nu_\tau \tau^+ \mu^- \bar{\nu}_\mu, \quad u\bar{d}sc$$

Denner et al., hep-ph/0502063



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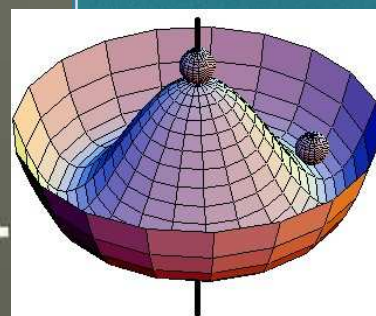
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PHYSICS REPORTS

A Review Section of Physics Letters

AUTOMATIC CALCULATIONS IN HIGH ENERGY PHYSICS AND GRACE AT ONE-LOOP

G. BÉLANGER, F. BOUDJEMA, J. FUJIMOTO,
T. ISHIKAWA, T. KANERO, K. KATO, Y. SHIMIZU



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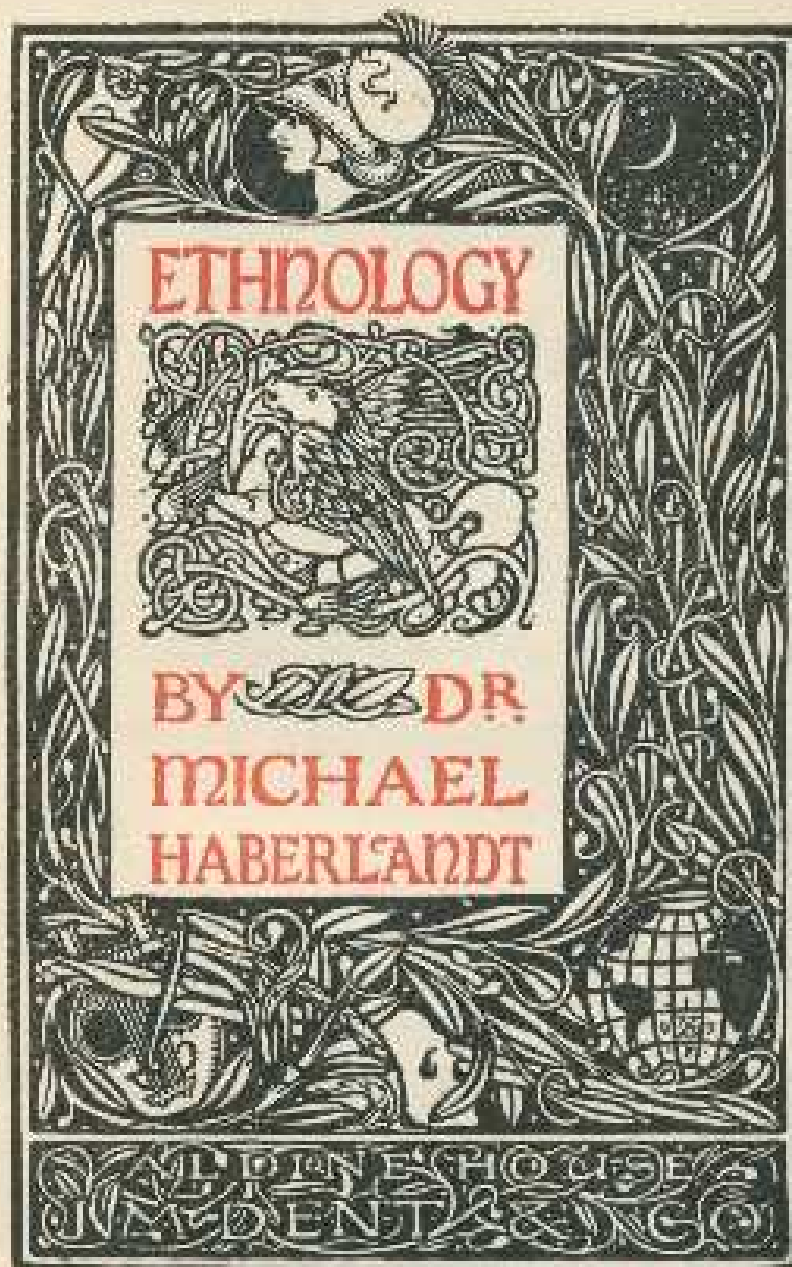
Cultural exchange



First webpage

France Minami-Tateya Collaboration





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kingdom is well organized, mountainous, and endowed with a happy climate. The Japanese of the present day are a mixed race springing from Mongolian immigrants in pre-historic times and from an indigenous population, remnants of which are still to be found among the unkempt hunting and fisher folk of the Ainos in the islands of Jesso and Sachalin. These prehistoric migrations probably originated from the Chinese mainland through Korea from south to north. Recently a share in the formation of the Japanese people has been attributed to the Malay as well as to the Mongolian races.

Language, as we have already remarked, clearly distinguishes the Japanese from the Chinese and Malayo-Chinese groups, amongst which their physical characteristics would otherwise easily have classed them. It is polysyllabic and agglutinative. The present written and spoken language is indeed a mixture of two entirely different dialects, the old Japanese and the Chinese. Compared with the Europeans the Japanese are short of stature; the men average scarcely five feet in height, the women considerably less. Amongst the people different types are clearly to be distinguished. The present population of Japan exceeds 36,000,000. The physical constitution of the Japanese is on the whole weak.

Intellectually the Japanese are many-sided, but not very talented. They have been fitly called the "French of the East" in this respect. Ordinary ideas are easily grasped, and taste is more frequently exhibited in their literature and art than profound thought. In their entire cultural history they figure rather as the adapters of foreign ideas than as the creators of their own. In many respects they are the diametrical opposites of the Chinese who are so reluctant to

surroundings of culture, he is polite and leaning towards companionship. Owing regard for the smaller details of life, the Japanese are called a nation of children. At the same time in mind their many excellent features, their contempt for death, and their sublime courage, numerous striking examples of which are their internal wars which lasted for many centuries.

They had long been accused of a desire of being susceptible to foreign influence, of very characteristics that we must ascribe to their country during the last three decades, forms of Orientalism to a civilized political modelled upon European institutions.

THE KOREANS.

As exhaustive as is our knowledge concerning so scanty, until recently, has been our information of the Koreans. The country well deserved the name of a sealed land which jealously guarded its course with the outside world. Korea remained stationary and clung to its original with rare persistency and conservatism. In its aristocratic form of government it presented to the traveller a sad and monotonous appearance. To minister all are dressed alike in one simple apparel, all are in white. The women except that they do not cover their bosom, otherwise is carefully clothed. Town and village are filthy, their mud-huts are thatched with straw and present a sorry appearance. The soil of

Enjoy the meeting!

