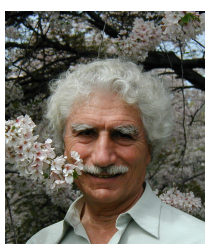


EARLY DAYS DISCOVERIES AND MORIOND

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Launched into particle physics space in 1966, the Moriond conference has been extremely successful in providing a forum for young and mature physicists alike, both experimentalist and theorists, to report results and discuss ideas for future research. Having attended 22 of the past “Morionds” since 1976, I present my reminiscences of the early days of Moriond.

1 Introduction

I am honored to be invited to speak on *Early Days Discoveries and Moriond* in the 50th Moriond celebration session. My experience is based on the conferences listed in Fig.1.

Mostly personal memories from...

<ul style="list-style-type: none">❑ MORIOND - 22 attended (why Moriond?)<ul style="list-style-type: none">❑ Flaine, France 1976-77❑ Les Arcs 78-79-80-81-83-85-90-91-97-99<ul style="list-style-type: none">❑ La Plagne 1983-84❑ LaThuile 2000-1-2-3-6-8-9-11-15❑ BLOIS / EDS – 11 attended (why Blois?)<ul style="list-style-type: none">❑ Chateau de Blois, France 1985❑ Rockefeller U, New York, USA 1987❑ Elba, Italy 1991❑ Brown U, Providence, USA 1993❑ Chateau de Blois, France 1995❑ Pruhonice (Prague), Czech Rep. 2001❑ Helsinki, Finland 2003❑ Blois, France 2005❑ Desy, Hamburg, Germany 2007❑ Quy Nhon, Vietnam 2011❑ Saariselka, Finland 2013	 
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Figure 1 – Moriond-Blois Conferences I attended.

Figure 1, as well as the other figures in this paper, has been extracted from the talk I presented at the conference. The original text and images of the talk were obtained either from files produced in a web search or from my own personal files (e.g., my talk at Moriond 1976).

There are two items in this figure that need to be explained:

Why Blois? The creation of the Blois (EDS, Elastic and Diffractive Scattering) conference series highlights the genius of Tran (Jean Tran Thanh Van), the creator of Moriond. When he sensed that the subject of EDS was growing fast, he created a branch dedicated to it. He wisely decided to hold the EDS series not in a ski resort, like the Moriond, but in some interesting non-ski-oriented city, in order to widen the participation of groups around the world as local hosts. Blois, France, was the first such place.

Conference name-tag. This is my first Moriond's name-tag: note the "40" inside the (red) circle. In the interest of saving money to make the Moriond more affordable, Tran collected all name-tags at the end of a conference for recycling. I had to beg him to let me keep mine, citing my service in advertising the conference in a Moriond legacy talk that I had given.

Figure 2 shows that the strong mountain sun can turn one's hair from brown-black to white. No need for a hair dresser to make you respectable by bleaching your hair, just go to Moriond!

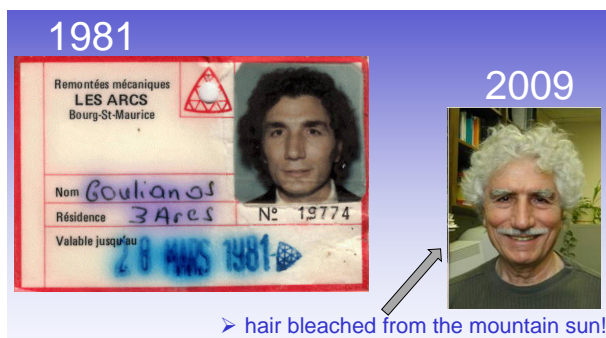


Figure 2 – My ski pass from Les Arcs in 1981 (left) and my portrait from a Moriond talk in 2009 (right).

Physics. Moriond is known as a ski-conference, but physics comes first! Skiing provides a physical release for the participants from an intense program of presentations of new results by young and mature physicists and engineers. The conference is open to both experimentalists and theorists participating in a common session. It is this model that introduced me to theorists and inspired my interest in phenomenology, which helped me better understand my experimental results. With discussions at breakfast, lunch, and dinner, and often heated arguments on the ski lifts, it builds friendships that last for a lifetime.

2 Moriond 1976 in Flaine – My first Moriond

I was invited to Moriond 1976 by John Illiopoulos, who was then at Rockefeller to talk on the observation of $\nu p_\mu \rightarrow p_\mu$ in pp collisions in the CIR (Columbia, Illinois, Rockefeller) experiment at the Brookhaven AGS. To fulfill the skiing “requirement,” he said, bring along your ice-skates.

Well, when I went to the outdoor skating rink the day I arrived in Flaine, I saw skiers coming down the mountain and was fascinated. The next day I arranged for a skiing lesson, and the instructor put me on two-foot-long skis. I did well on them, skiing on a baby slope. After the lesson, he told me that I could go on my own on a certain chair and come slowly down the slope.

I took the wrong chair by mistake and ended up on the very top of the mountain. Coming down was impossible, so I decided to descend by sliding on my butt. A friendly skier with a German accent stopped by me and asked if I needed help “to get up.” No, I replied, I am doing OK sliding on my butt and using my skies as brakes. “Ah so!” he said and gave me a strange look!

Moriond 1976 was packed with physics results and proposals for the future, too many to list here. The Moriond experience committed me to be coming back, and I gladly accepted Tran's invitation to the 1997 Moriond as a summary speaker of the “Electromagnetic and Leptonic Interactions” session.

3 Moriond 1977 in Flaine – My ski-enhanced Moriond

Excited about skiing in Flaine again, this time I brought along a pair of two-meter-long purple Head skis with bindings preset to *expert* mode. My friends, Illiopoulos and the Baltays (Charlie and his wife Ginnie) among them, conspired to take me to Diamond Noir, the steepest slope in Flaine (Fig. 3). Ginnie goes first, falls, tumbles all the way down, breaks one ski and both poles, loses the other ski, and falls flat at the bottom of the slope. Oh, no! I cried, thinking of the worst. But then, to my great relief, she stands up and waves with her broken poles.

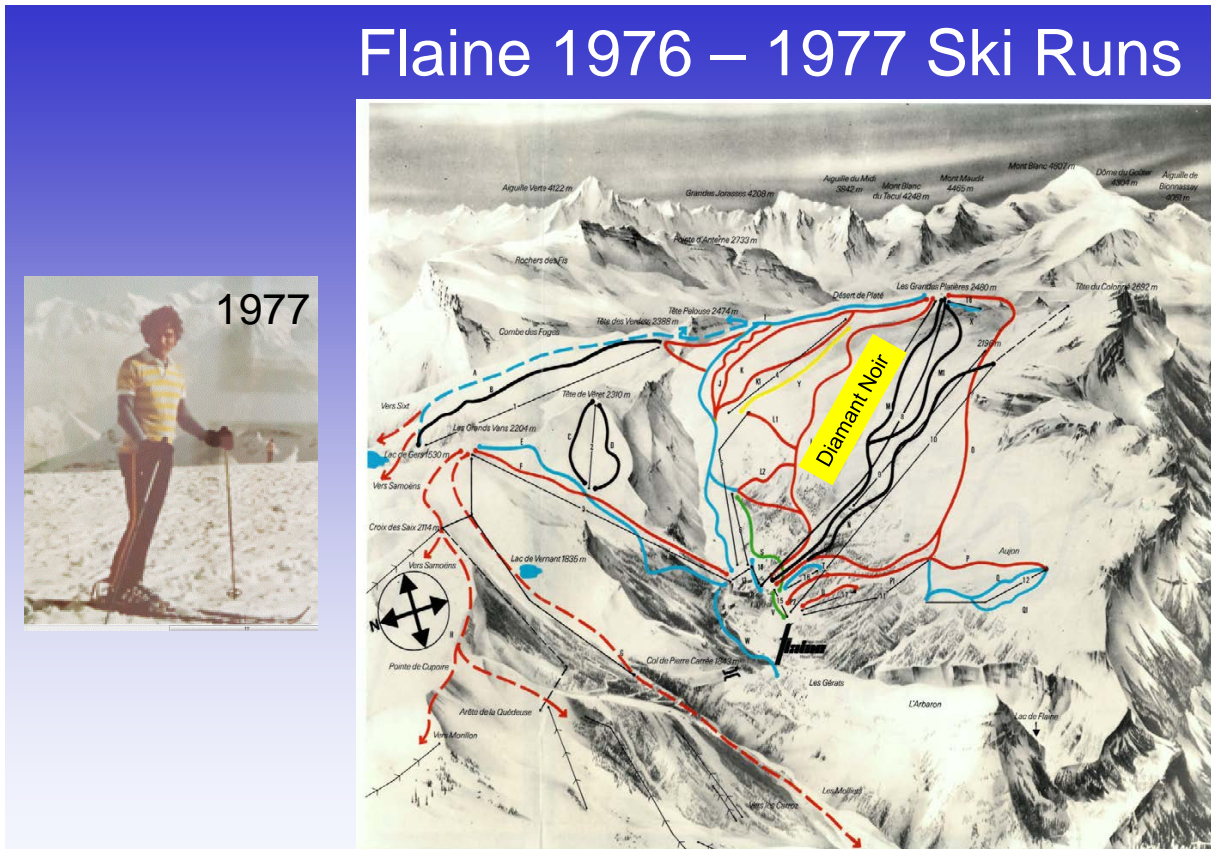
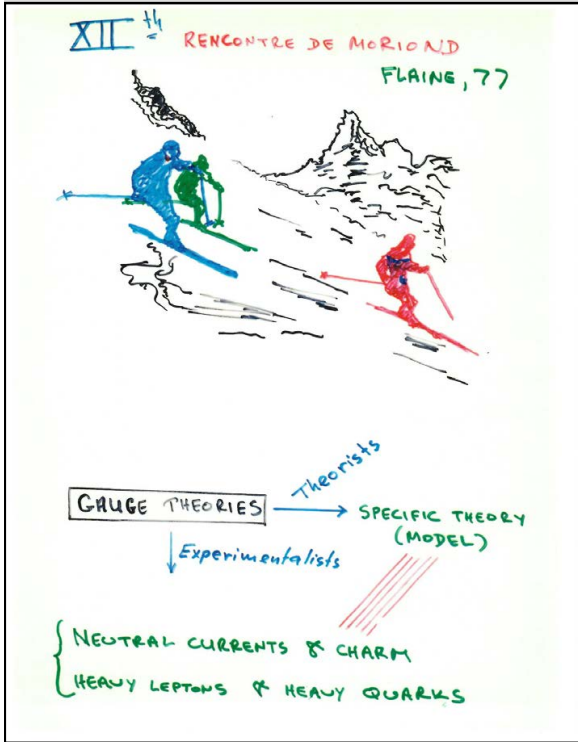


Figure 3 – Flaine 1976-77: my first time on long skis (left) and the ski-run plan (Diamond Noir story in text).

“Your turn is next,” ordered the team with a smirk. “No problem,” I said and threw myself down the slope, making a wide turn and getting stuck on the right side of the tube-like slope pondering what to do next. A skier stopped by and yelled, “What on earth are you doing on this slope?” Recognizing him as my last year’s ski instructor, I replied, “I am practicing the tips you gave me last year.” “Good luck,” he said with shaking his head in disbelief, and disappeared skiing down into a passing cloud. Swinging from one side of the tube to the other, I came down after multiple falls to the delight of my friends for my entertaining performance.

Physics at Moriond 1977. Neutral currents, charm, and dileptons dominated the conference. Martin Perl’s talk confirming the discovery of the τ -lepton brought down the house! In 1976 he show a preliminary result on the subject that raised a lot of interest, but also some doubts. If a third lepton were to exist, it would be probably paired with a neutrino, which would clash with the existing prejudice favoring the two-neutrino theory of the standard model. This would be revolutionary! Yet, Perl presented evidence for a third lepton in 1976 and, after more studies, he promoted his result to a discovery of the τ in 1977. I remember him telling me about it on the conference bus from CERN to Flaine. I will never forget that moment.

Figures 4, 5, and 6 present, respectively, the general categories of physics topics covered in Moriond 1977, Perl’s contribution, and the concluding remarks of my summary talk.



- Neutral currents
 - $\nu_\mu + p \rightarrow \nu_\mu + p$ observed
Columbia, Illinois, Rockefeller
- Charm
 - SPEAR (LBL-SLAC) $\rightarrow DD^*$
 - $e^+e^- \rightarrow KX$ vs \sqrt{s} (SPRAR / DORIS)
- Dileptons
 - Dimuons, $e\mu$, ...
- Heavy leptons
 - $\tau \rightarrow \tau$ ριτον (Martin Perl)

Figure 4 – Original slide 1 of my Moriond 1977 summary talk (left) and reported discoveries (right).

The τ (τριτον) Lepton

EVIDENCE FOR, AND PROPERTIES OF, THE NEW CHARGED HEAVY LEPTON^{*†}

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*Paper presented at the XII Rencontre de Moriond (Flaine, March 6-18, 1977; to be published in the Proceedings of the XII Rencontre de Moriond, edited by Tran Thanh Van, R.M.I.E.M. Orsay.



Figure 5 – Nobel Laureate Martin Perl announcing the τ (triton) discovery at Moriond 1977.

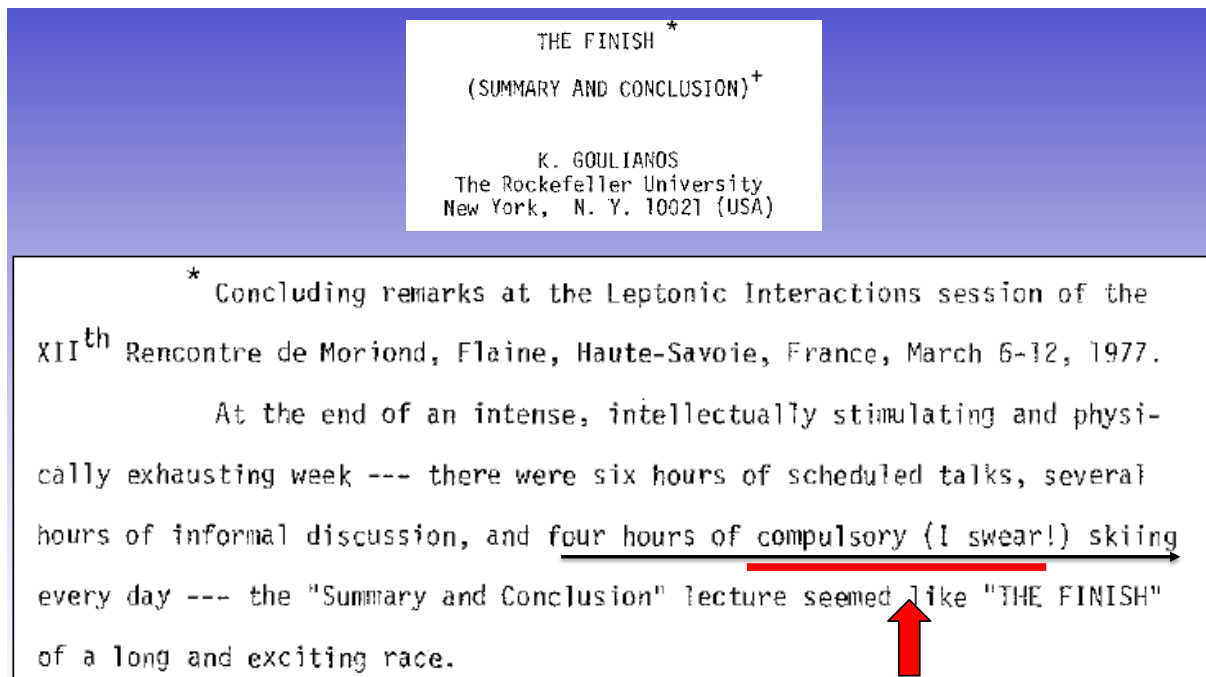


Figure 6 – Concluding remarks of my summary talk “The Finish” at Moriond 1977.

4 Moriond 1978 in Les Arcs – what an experience!

After two years in Flaine, Tran moved the Moriond Conference to Les Arcs, another French resort. The physics experience was still dynamic, featuring, among others, Steve Ellis and Gordon Kane on gluons, Fig. 7; Leon Lederman (**Leon**) on the Upsilon observation, Fig. 8 (left); and myself (**the Peon**), Fig. 8 (right), on diffractive hadron dissociation.

Skiing in Les Arcs was, to say it kindly, more intense. Remembering my encounters with the rather unfriendly mountain slopes brings a mixed feeling of fear and accomplishment. There are many *cutting-edge* adventures to report – please query me the next time we meet.

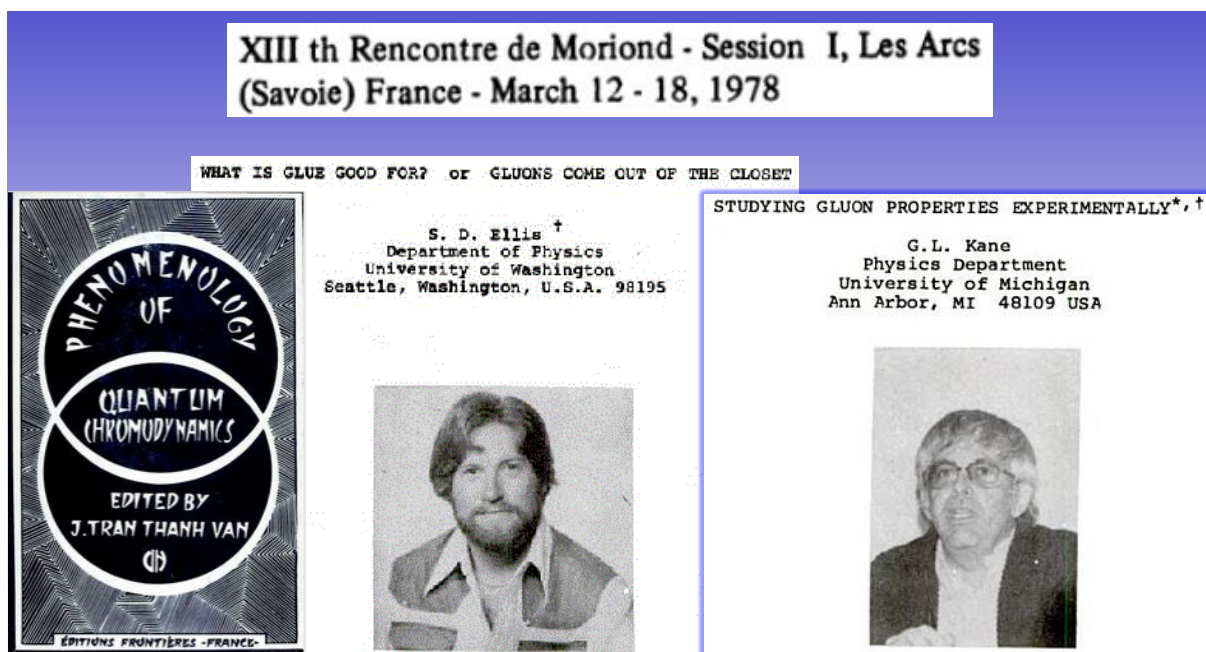


Figure 7 – The Moriond Proceedings 1978 cover page (left), Steve Ellis (middle), and Gorgon Kane (right).

MORIOND 1978 – LES ARCS

Leon and the Peon

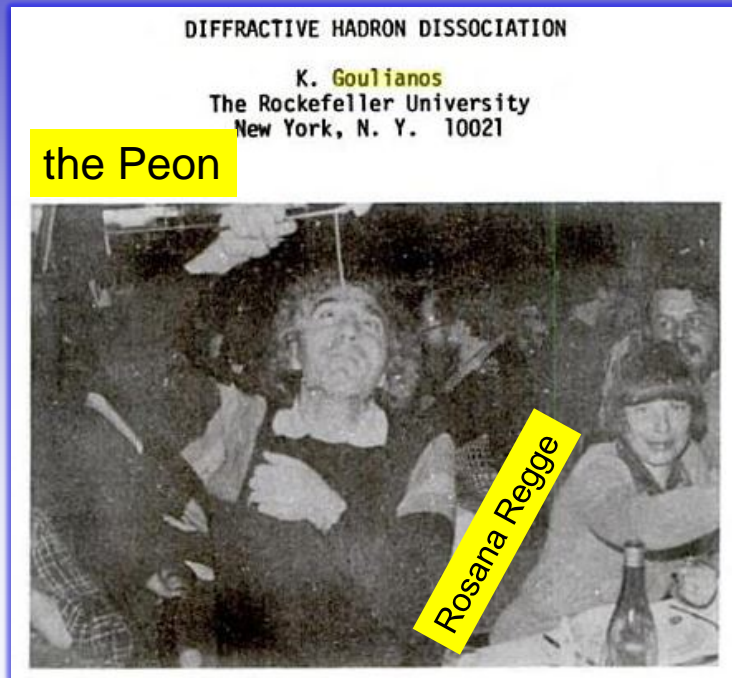
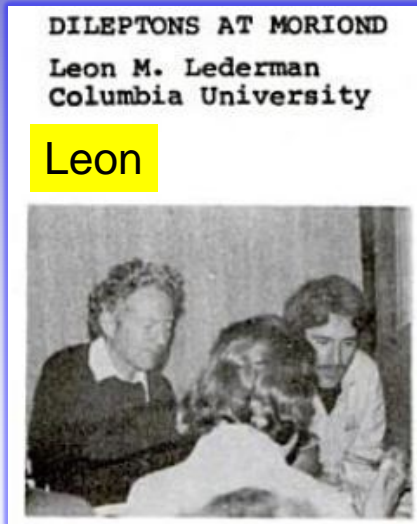


Figure 8 – Leon and the Peon: **Leon** Lederman with Steve Ellis and unidentified participant (left), and **the Peon** (myself) demonstrating a spaghetti-eating technique I invented, with **Rosana Regge** (right) ignoring me!

5 My Moriond

Moriond is the conference that shaped my life by its ingredients::

Participants: All welcome:

Professors, students, Scientists, Engineers.

Prerequisites: A passion for science – and skiing!

⇒ Ancient Greece: **healthy mind in healthy body.**

Rewards: Meet other scientists, make life-long friends.

Meet Kim and Tran, and your hard work will be fun!

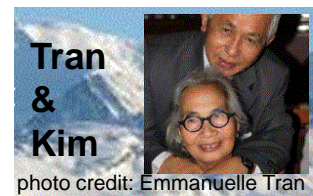


Figure 9 – Tran and Kim.

Acknowledgments

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