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# Where, I believe, it started





Nel 1979 ha proposto lo studio della spettroscopia del Charmodio, utilizzando un getto di Idrogeno gassoso e gli antiprotoni raffreddati della sorgente del CERN accumulati nel ISR del CERN, in tale modo si sfruttava la grande risoluzion e energetica dei fasci raffreddati ed il fatto che nell'annichilazione antiprotone protone si ha accesso in formazione a tutti gli stati di spin e parità, mentre nell'annichilazione e+e- si ha accesso solo agli stati vettoriali. Il peogiore rapporto seconale-rumore è stato superato

Il peggiore rapporto segnale-rumore è stato superato con uno spettrometro semplice che guardava i decadimenti elettromagneti degli stati di charmonio.

P. Dalpiaz, Proceedings of the first LEAR workshop, Karlsruhe, Germany, edited by H. Poth, 1979

a really neat idea and the playing field to which it applied full of riches for the taking.





A full QCD spectrum to investigate and study





CM-P00040528

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LETTER OF INTENT

<u>À SEARCH FOR</u> n<sub>c</sub> <u>PSEUDOSCALAR CHARMED MESON AND</u> CHARMONIUM SPECTROSCOPY

P. Dalpiaz<sup>1)</sup>, V. Gracco<sup>2)</sup> and M. Macri<sup>2)</sup>

GENEVA

1979

1) Università di Torino and INFN Sezione di Torino.

2) Università di Genova and INFN Sezione di Genova.

We would like to propose an unconventional use of the ISR to study the existence of  $\eta_c$ . A  $\overline{p}$  beam injected into Ring 2 of the ISR would be tuned at a momentum such that in a collision with an H<sub>2</sub> jet target the centre-of-mass energy  $\sqrt{s}$  would vary in a mass range corresponding to the expected mass of  $\eta_c$ . The

**Unconventional** indeed ... Precious antiprotons, & running a machine a factor 10 below its typical energy...

CERN

Gianni e Dalpiaz^2 Fest - Ferrara

**R704** Collaboration

Annecy (LAPP)-CERN-Genoa-Lyon (IPN)-Oslo-Rome-Strasbourg-Turin

#### No Logo

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With a small amount of luminosity, demonstrated the feasibility and the potential of the technique, and achieved remarkable measurements of masses and widths of chi states etc ..

Then the Intersecting Storage Rings were closed and became just the LSR (LEP Storage Rings)

Plans were afoot to move this to Fermilab where an antiproton source was being developed for the Tevatron





Fermilab P-760: A Proposal to investigate the formation of Charmonium States using the PBAR Accumulator Ring: Spokesperson R. Cester Fermilab<sup>1</sup>, University of Ferrara<sup>2</sup>, University of Genova<sup>3</sup>, University of California at Irvine<sup>4</sup>, Northwestern University<sup>5</sup>, Pennsylvania State University<sup>6</sup> and University of Torino<sup>7</sup>.













#### PROPOSAL TO CONTINUE THE STUDY OF CHARMONIUM SPECTROSCOPY IN **PROTON-ANTIPROTON ANNIHILATIONS** (Revised proposal P-835)

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\* Student expected to graduate on current data.

#### The E760 Collaboration September 1 1992





### PROPOSAL TO CONTINUE THE STUDY OF CHARMONIUM SPECTROSCOPY IN PROTON-ANTIPROTON ANNIHILATIONS.

18th November 1997

Fermilab-Ferrara-Genova-Irvine-Northwestern-Torino "Charmonium" Collaboration - spokesperson R. Cester<sup>1</sup>







Ferrara built the inner tracking chamber – a radial projection chamber to measure heta





Ferrara built a double set of Scintillating fiber trackers  $\ \ \$  to measure  $\theta$ 



October 8 2018





## 1986 - 2005

Precision measurements on charmonium states

- > 25 papers on physics results
- > 35 Ph.D's minted ...

starting from Nel 1979 ha proposto.





## 1986 - 2005

Nel 1979 ha proposto..

L'esperimento è stato realizzato prima all'ISR e completato con le collaborazioni E760 ed E835 all'Accumulatore di Antiprotoni del Fermi-Lab, ottenendo importanti risultati tra i quali risaltano la misura diretta della larghezza degli stati  $\chi_c$  dell'  $\eta_c$  e la scoperta dello stato  ${}^1P_1$  del charmonio.

#### Bravo, bravo, bravo

The charmonium at Fermilab story starts officially in 1986,

It went on in data runs from 1990 to 2001 – and papers came out till at least 2005 to exploit fully the data we accumulated – and it continues to live in some very happy memories ..





#### A letter from John Peoples about the occasion he was awarded this doctorate.







Letter from John Peoples, ex-director Fermilab ..

Dear Stephen,

I know this is late but there is one reminiscence of Piero that I want to share because Piero organized a wonderful and meaningful day.

It was the day I received an honorary doctorate from the University of Ferrara on the occasion of the 650th anniversary of the founding of the University of Ferrara.

I believe it was in 1992 or 1993. In order to qualify for this honor I was a student at the University for a day and I was expected to give a short speech to the dignitaries of the town who assembled for the event. It involved many dignitaries from the city and from the University; but not too many, just the right number to make it warm, personal and festive. Each person had a colorful uniform to represent their station in Ferrara. They assembled for a parade to the auditorium, Piero and I were part of the parade, we marched into the auditorium, there were remarks, I gave my short speech on international collaboration in science; of which the Charmonium experiment was a fine example, and then I received an honorary degree from the University. Many of our Italian colleagues from E760 were in attendance and later that evening we all went to dinner.

It was a wonderful day; in fact the most memorable day of my life. The parade of the dignitaries is still vivid in my mind. The degree parchment was so beautiful that Nancy, my wife, framed it in a beautiful ornate frame after I returned home. I still see it every day in my study in the continuing care community in which I live.

The theme of my speech was international collaboration in science and it is still a noble and thoughtful way of working together. I hope it does not disappear in these days of Trump and Salvini. Piero arranged the whole day and evening.

Working on E760 was such a joy when I was able to work on it. Please thank Piero for my day as his student and helping to guide E760.

There are pictures of the event, but I cannot find them. The march of the dignitaries was one that I particularly cherish.

I apologize that I delayed my response for so long.

Best Regards, John

