QCD/HFS group report

Sergei Chekanov (ANL)
Nick Brook (external) Juan Terrón, Mark Sutton

Sep. 2002

DESY, Hamburg

- ✔ Group structure
- ✔ Paper status
- ✔ Future plans
- ✔ Recent presentations

Group Structure

- Coordinators: Juan Terron, Mark Sutton, Nick Brook, S.Chekanov
- Funnel coordinator: Andy Ziegler
- Trigger coordinator: Sabine Lammers
- Meetings: Every Thursday, 13.30, S.R.3
- Web page: `http://giroz.desy.de/physics/qcd`

QCD/HFS subgroups:

Subgroups	Coordinator	Meetings
Jets in DIS	J.Terron	Wednesday, 16.00
Instantons	M.Sutton	Friday, 11.00
Particle production	M.Sutton/S.Chekanov	Monday, 13.00

abs	title	authors
839*	One- and two-dimensional Bose-Einstein effect	L.Zawiejski, K.Olkiewicz, S.Chekanov, M.Derrick
843*	Scaling violations in γp interactions at HERA	C.Glasman, A.Lupi
845*	Jet production in charged current DIS	C.Glasman, M. Vazquez
846	K_s^0 and Λ production in DIS *(not sent)*	S.Paganis, M.Barbi, A.Ziegler,A.Ziegler
848*	Multijet production in DIS	N.Krumnack, S. Chekanov, L.Li
849	Multijets in photoproduction	C.Gwenlan, M.Sutton, J.Butterworth
850	Inclusive $\phi(1020)$ production in DIS	S.Chekanov, M.Derrick,B.Levchenko, J.Repond
851	Observation of prompt photons in DIS *(not sent)*	M.Bell, D.Saxon
852*	Rapidity gaps in photoproduction	C.Gwenlan, M.Sutton
853	Measurement of strange baryons *(not sent)*	A.Ziegler, B.Levchenko
855	Inclusive jet cross sections in neutral current DIS	O.Gonzalez, J.Terron, H.Raach
854*	Virtual-photon structure in dijet production	A.Lupi, D.Kcira, H.Labes
857	Dijets in PHP and photon structure *(published)*	M.Wing, E.Heaphy, J.Terron, A.Ochs, J.Butterworth
858	High-mass dijet cross sections in *PHP (published)*	C.Glasman, J.Terron
859	Dijet production in neutral current DIS *(published)*	D.Chapin, M.Przybycien, C.Foudas, M.Wing

12 papers sent, 6 papers contain new results

Papers at EB stage

- ✔ Event shapes in DIS — past 2nd EB
- ✔ Observation of the strange sea via inclusive ϕ — past 2nd EB
- ✔ Subjets in NC DIS — past 1st EB
- ✔ Azimuthal asymmetry in DIS — past 1st EB (Sep.27-reading)

Papers at pre-EB stage (released by the group):

- ➠ Virtual photon structure in DIS — (A.Lupi, D.Kcira, H.Labes)
- ➠ Scaling violation and α_s in PHP (Sep.30-Monday presentation) — (C.Glasman, A.Lupi)

Papers to be ready before the ZEUS Coll. week:

- ➠ Jets in CC DIS — (M..Vazquez, C.Glasman)
- ➠ BEC effect in DIS — (L..Zawiejski, K.Olkiewicz, S.Chekanov, M.Derrick)

- ★July 4: Structure of virtual photons from dijets (Anna Lupi)
- July 11: Improved fits of the azimuthal asymmetry using jets (O.Gonzalez)
- July 25: $K^0_s K^0_s$ final state in DIS (S.Paganis and M.Barbi)
- August 1: $K^0_s K^0_s$ final state in DIS (M.Barbi and S. Paganis)
- August 1: Hadronic energy flow (J.Butterworth)
- ★August 1: Scaling violations in gamma p interactions at HERA (C.Glasman)
- August 15: Jet production in CC (99-00 data + measurement of α_s) (M.Vazquez)
- ★August 15: Virtual photon structure in dijet production at HERA (A.Lupi)
- August 22: Prompt photons in DIS (Sep.19,13.30,Sr.3) (M.Bell)
- August 22: Instanton search (S.Hillert)
- August 22: $K^0_s K^0_s$ final state in DIS (S. Paganis)
- August 29: Update of Bethke's compilation (O. Gonzalez)
- August 29: Strange baryon production in DIS (A.Ziegler)
- ★August 29: Scaling violations in gamma p interactions at HERA (C.Glasman)
- September 5: Multijets in DIS (A.Morgan)

Hadronic jet energy flow (J.Butterworth)

Summarized "Snowmass 2001: Jet Energy Flow Project"

Motivated by papers of F.Tkachov (Int.J.Mod.Phys.A12:5411-5529,1997) who proposed to measure the so-called "C-correlator":

$$F_m(P) = \sum_{i_1 \ldots i_m} E_{i_1} \ldots E_{i_m} \cdot f_m(\overrightarrow{p_{i_1}}, \ldots \overrightarrow{p_{i_m}})$$

instead of the usual jets, but to understand the method is very hard! (see `hep-ph/9601308`,`hep-ph/0012210`):

Advantages:

- No attempt is made to associate individual partons with jets
- Yet the energy flow still provides footprint of the underlying partons
- Small sensitivity to hadronisation
- Stable, continues, collinear/infrared safe, small hadronization corrections

At Snowmass 2001 it was proposed to simplify this method $\Longrightarrow$ read `hep-ph/0202207` !