

# RADCOR 2002 – LOOPS and LEGS 2002

## Schedule

**Sunday, September 08:**

5.00 p.m. **Begin of Registration**

**Monday, September 09: Morning Session**

7.30 a.m. – 9.00 a.m. **Breakfast**

### $e^+e^-$ Physics

9.00 a.m. – 9.10 a.m.		Opening
9.10 a.m. – 9.30 a.m.	<b>N. Glover</b>	Progress in NNLO calculations in $e^+e^-$ annihilation
9.30 a.m. – 9.40 a.m.		Discussion
9.40 a.m. – 10.00 a.m.	<b>P. Uwer</b>	Two-loop amplitudes for $e^+e^- \rightarrow 3$ jets at NNLO QCD
10.00 a.m. – 10.10 a.m.		Discussion
10.10 a.m. – 10.30 a.m.	<b>T. Gehrmann</b>	Jet physics at 2-loop accuracy
10.30 a.m. – 10.40 a.m.		Discussion
10.40 a.m. – 11.10 a.m.		<b>Coffee Break</b>
11.10 a.m. – 11.30 a.m.	<b>S. Pozzorini</b>	Leading electroweak logarithms
11.30 a.m. – 11.40 a.m.		Discussion
11.40 a.m. – 12.00 a.m.	<b>S. Moch</b>	Sudakov logarithms in 4-fermion electroweak processes at high energy
12.00 a.m. – 12.10 a.m.		Discussion
12.10 a.m. – 12.25 a.m.	<b>M. Melles</b>	Supersymmetric Sudakov corrections
12.25 a.m. – 12.30 a.m.		Discussion
12.30 a.m. – 12.50 a.m.	<b>H. Haber</b>	Decoupling and the radiatively corrected MSSM Higgs sector
12.50 a.m. – 1.00 p.m.		Discussion
1.00 p.m. – 2.10 p.m.		<b>Lunch Break</b>

**Monday, September 09: Afternoon Session**

**$e^+e^-$  Physics**

2.10 p.m.	–	2.50 p.m.	<b>A. Wagner</b>	TESLA - a new tool for science
2.50 p.m.	–	3.00 p.m.		Discussion
3.00 p.m.	–	3.20 p.m.	<b>K. Kołodziej</b>	Top quark pair production and decay into 6 fermions at linear colliders
3.20 p.m.	–	3.30 p.m.		Discussion
3.30 p.m.	–	3.50 p.m.	<b>M. Roth</b>	6-fermion production at $e^+e^-$ colliders
3.50 p.m.	–	4.00 p.m.		Discussion
4.00 p.m.	–	4.30 p.m.		<b>Coffee Break</b>
4.30 p.m.	–	4.50 p.m.	<b>A. Werthenbach</b>	Massive two-loop Bhabha scattering - the factorizable subset
4.50 p.m.	–	5.00 p.m.		Discussion
5.00 p.m.	–	5.20 p.m.	<b>D. Bardin</b>	Project CalcPHEP: calculus for precision high energy physics
5.20 p.m.	–	5.30 p.m.		Discussion
5.30 p.m.	–	5.50 p.m.	<b>A. Sirlin</b>	Topics in electro-weak physics
5.50 p.m.	–	6.00 p.m.		Discussion
6.00 p.m.	–	6.20 p.m.	<b>J. Bartels</b>	Photon impact factor in NLO
6.20 p.m.	–	6.30 p.m.		Discussion
6.30 p.m.	–	6.50 p.m.	<b>M. Kalmykov</b>	Full two-loop electroweak corrections to the pole of gauge bosons
6.50 p.m.	–	7.00 p.m.		Discussion
7.00 p.m.				<b>Dinner</b>

## Tuesday, September 10: Morning Session

### *ep* Physics

7.30 a.m.	–	8.40 a.m.		<b>Breakfast</b>
8.40 a.m.	–	9.10 a.m.	<b>M. Klein</b>	Structure functions at HERA - status and future
9.10 a.m.	–	9.20 a.m.		Discussion
9.20 a.m.	–	9.50 a.m.	<b>J. Vermaseren</b>	First results for three loop deep inelastic structure functions in QCD
9.50 a.m.	–	10.00 a.m.		Discussion
10.00 a.m.	–	10.20 a.m.	<b>A. Kataev</b>	NNNLO fits of $xF_3$ data: $\alpha_s$ vs. $1/Q^2$ contributions
10.20 a.m.	–	10.30 a.m.		Discussion
10.30 a.m.	–	11.00 a.m.		<b>Coffee Break</b>
11.00 a.m.	–	11.20 a.m.	<b>H. Kawamura</b>	Higher order QED corrections to deep inelastic scattering
11.20 a.m.	–	11.30 a.m.		Discussion
11.30 a.m.	–	11.50 a.m.	<b>S. Capitani</b>	Perturbative and non-perturbative lattice calculations for the study of parton distributions
11.50 a.m.	–	12.00 a.m.		Discussion
12.00 a.m.	–	12.20 a.m.	<b>K. Sasaki</b>	Twist-3 effects for polarized virtual photon structure function $g_2^\gamma$
12.20 a.m.	–	12.30 a.m.		Discussion
12.30 a.m.	–	12.50 a.m.	<b>M. Steinhauser</b>	$\sigma(e^+e^- \rightarrow \text{hadrons})$ and the heavy quark mass
12.50 a.m.	–	1.00 p.m.		Discussion
1.00 p.m.	–	2.30 p.m.		<b>Lunch Break</b>

## Tuesday, September 10: Afternoon Session

### *ep* Physics

2.30 p.m.	–	2.50 p.m.	<b>B. Kniehl</b>	Quarkonium production in DIS
2.50 p.m.	–	3.00 p.m.		Discussion
3.00 p.m.	–	3.20 p.m.	<b>T. Uematsu</b>	Virtual photon structure functions
3.20 p.m.	–	3.30 p.m.		Discussion
3.30 p.m.	–	3.50 p.m.	<b>M. Klasen</b>	$J/\psi$ production in $\gamma\gamma$ collisions
3.50 p.m.	–	4.00 p.m.		Discussion
4.00 p.m.	–	4.30 p.m.		<b>Coffee Break</b>

**Tuesday, September 10: Afternoon Session**

**$e^+e^-$  Physics**

4.30 p.m. – 4.50 p.m.	<b>S. Riemann</b>	Electroweak precision measurements in $e^+e^-$ annihilation into fermions
4.50 p.m. – 5.00 p.m.		Discussion
5.00 p.m. – 5.20 p.m.	<b>R. Chierici</b>	Electroweak precision measurements in $e^+e^-$ annihilation into bosons
5.20 p.m. – 5.30 p.m.		Discussion
5.30 p.m. – 5.50 p.m.	<b>K. Chetyrkin</b>	Towards the 5-loop polarization functions in pQCD: the first $O(\alpha_s^4 N_f^2)$ results and their applications
5.50 p.m. – 6.00 p.m.		Discussion
6.00 p.m. – 6.20 p.m.	<b>O. Tarasov</b>	One-loop correction to $e^+e^- \rightarrow \mu^+\mu^-$ in terms of a non-singular basis of Feynman integrals
6.20 p.m. – 6.30 p.m.		Discussion
6.30 p.m. – 6.50 p.m.	<b>P. Baikov</b>	Advanced methods of multi-loop integrals calculations: status and perspectives
6.50 p.m. – 7.00 p.m.		Discussion
7.00 p.m. – 7.50 p.m.		<b>Dinner</b>

8.30 p.m.

*Concert*

## Wednesday, September 11: Morning Session

7.00 a.m. – 8.00 a.m. **Breakfast**

### *pp* Physics

8.00 a.m. – 8.40 a.m.	<b>K. Jakobs</b>	Physics at the LHC
8.40 a.m. – 8.50 a.m.		Discussion
8.50 a.m. – 9.10 a.m.	<b>U. Baur</b>	Electroweak radiative corrections to weak boson production at hadron colliders
9.10 a.m. – 9.20 a.m.		Discussion
9.20 a.m. – 9.40 a.m.	<b>J. Smith</b>	NLO distributions for Higgs production at the LHC
9.40 a.m. – 9.50 a.m.		Discussion
9.50 a.m. – 10.10 a.m.	<b>R. Harlander</b>	NNLO Higgs production at Tevatron and LHC
10.10 a.m. – 10.20 a.m.		Discussion
10.20 a.m. – 10.40 a.m.	<b>F. Piccinini</b>	Prospects of Higgs properties determination at LHC
10.40 a.m. – 10.50 a.m.		Discussion
10.50 a.m. – 11.10 a.m.		<b>Coffee Break</b>
11.10 a.m. – 11.30 a.m.	<b>S. Dittmaier</b>	NLO QCD corrections to Higgs production with associated heavy-quark pairs at hadron colliders
11.30 a.m. – 11.40 a.m.		Discussion
11.40 a.m. – 12.00 a.m.	<b>C. Anastasiou</b>	Phase-space integrations with multiloop methods and application to NNLO Higgs production via gluon fusion
12.00 a.m. – 12.10 a.m.		Discussion
12.10 a.m. – 12.30 a.m.	<b>W. van Neerven</b>	NLO corrections to the polarised Drell-Yan cross section in proton-proton collisions
12.30 a.m. – 12.40 a.m.		Discussion
12.40 a.m. – 1.00 p.m.	<b>J. Kodaira</b>	Lepton asymmetry in polarized Drell-Yan process
1.00 p.m. – 1.10 p.m.		Discussion
1.10 p.m. – 2.10 p.m.		<b>Lunch Break</b>

2.15 p.m. *Excursion*

*Coburg Castle and Ehrenburg Palace*

## Thursday, September 12: Session I

7.00 a.m. – 8.00 a.m. **Breakfast**

### Computing and General Aspects

8.00 a.m. – 8.20 a.m.	<b>J. Fleischer</b>	DIANA and selected applications
8.20 a.m. – 8.30 a.m.		Discussion
8.30 a.m. – 8.50 a.m.	<b>J. Fujimoto</b>	1-loop automatic calculation with GRACE system
8.50 a.m. – 9.00 a.m.		Discussion
9.00 a.m. – 9.20 a.m.	<b>T. Hahn</b>	Speeding up the computation of matrix elements with threads
9.20 a.m. – 9.30 a.m.		Discussion
9.30 a.m. – 9.50 a.m.	<b>G. Heinrich</b>	Numerical methods for NNLO calculations
9.50 a.m. – 10.00 a.m.		Discussion
10.00 a.m. – 10.20 a.m.	<b>A. Penin</b>	Potential NRQCD and heavy-quarkonium spectrum at NNLO
10.20 a.m. – 10.30 a.m.		Discussion
10.30 a.m. – 11.00 a.m.		<b>Coffee Break</b>
11.00 a.m. – 11.20 a.m.	<b>T. Binoth</b>	Progress in calculating hexagon amplitudes at one-loop
11.20 a.m. – 11.30 a.m.		Discussion
11.30 a.m. – 11.50 a.m.	<b>D. Kreimer</b>	Unique Factorization in Perturbative QFT
11.50 a.m. – 12.00 a.m.		Discussion
12.00 a.m. – 12.20 a.m.	<b>M. Skrzypek</b>	Precision $W$ -pair physics with YFSWW3 and KoralW Monte Carlos
12.20 a.m. – 12.30 a.m.		Discussion

### SUSY and Beyond the Standard Model

12.30 a.m. – 12.50 a.m.	<b>J. Sola</b>	Supersymmetric effects on charged Higgs boson production at hadron colliders
12.50 a.m. – 1.00 p.m.		Discussion
1.00 p.m. – 2.30 p.m.		<b>Lunch Break</b>

Thursday, September 12: Session I

## SUSY and Beyond the Standard Model

2.30 p.m. – 2.50 p.m.	<b>J. Guasch</b>	Fermionic decays of sfermions in the MSSM: a full one-loop calculation
2.50 p.m. – 3.00 p.m.		Discussion
3.00 p.m. – 3.20 p.m.	<b>G. Eilam</b>	Rare $Z$ decays
3.20 p.m. – 3.30 p.m.		Discussion
3.30 p.m. – 3.50 p.m.	<b>S. Penaranda Rivas</b>	Decoupling behaviour of $O(m_t^4)$ corrections to the $h_0$ self-coupling
3.50 p.m. – 4.00 p.m.		Discussion
4.00 p.m. – 4.30 p.m.		<b>Coffee Break</b>
4.30 p.m. – 4.50 p.m.	<b>R. Rückl</b>	Neutrino oscillations, SUSY seesaw mechanism, and charged lepton-flavour violation
4.50 p.m. – 5.00 p.m.		Discussion
5.00 p.m. – 5.20 p.m.	<b>J. Illana</b>	Lepton-flavour-violating $Z$ decays in the MSSM
5.20 p.m. – 5.30 p.m.		Discussion
5.30 p.m. – 5.50 p.m.	<b>F. Del Aguila</b>	Low energy constraints on Kaluza-Klein modes
5.50 p.m. – 6.00 p.m.		Discussion
6.00 p.m. – 6.20 p.m.	<b>G. Weiglein</b>	Two-loop results for electroweak precision observables in the Standard Model and the MSSM
6.20 p.m. – 6.30 p.m.		Discussion
6.30 p.m. – 6.50 p.m.	<b>S. Heinemeyer</b>	Recent higher-order corrections in the MSSM Higgs boson sector
6.50 p.m. – 7.00 p.m.		Discussion

7.30 p.m.

*Conference Dinner*

## Thursday, September 12: Session II

7.00 a.m. – 8.00 a.m. **Breakfast**

### Precision at low energies

8.00 a.m. – 8.20 a.m.	<b>M. Deile</b>	News from the muon $g-2$ experiment at BNL
8.20 a.m. – 8.30 a.m.		Discussion
8.30 a.m. – 8.50 a.m.	<b>I. Logashenko</b>	Recent results on low energy $R$ measurements in Novosibirsk
8.50 a.m. – 9.00 a.m.		Discussion
9.00 a.m. – 9.20 a.m.	<b>A. Nyffeler</b>	Hadronic light-by-light scattering contribution to the muon $g-2$
9.20 a.m. – 9.30 a.m.		Discussion
9.30 a.m. – 9.50 a.m.	<b>J. Gluza</b>	Muon decay to one-loop order in the LR-symmetric model
9.50 a.m. – 10.00 a.m.		Discussion
10.00 a.m. – 10.20 a.m.	<b>O. Veretin</b>	Two-Loop electro-weak corrections to $\Delta r$
10.20 a.m. – 10.30 a.m.		Discussion
10.30 a.m. – 11.00 a.m.		<b>Coffee Break</b>
11.00 a.m. – 11.20 a.m.	<b>M. Czakon</b>	Two-Loop bosonic correction to the muon decay in the Standard Model
11.20 a.m. – 11.30 a.m.		Discussion
11.30 a.m. – 11.50 a.m.	<b>D. Denig</b>	Measuring the hadronic cross section via radiative return
11.50 a.m. – 12.00 a.m.		Discussion
12.00 a.m. – 12.20 a.m.	<b>H. Czyz</b>	Radiative return at $e^+e^-$ factories
12.20 a.m. – 12.30 a.m.		Discussion

### Flavour Physics

12.30 a.m. – 12.50 a.m.	<b>G. Buchalla</b>	Exclusive hadronic $B$ decays in QCD
12.50 a.m. – 1.00 p.m.		Discussion
1.00 p.m. – 2.30 p.m.		<b>Lunch Break</b>
2.30 p.m. – 2.50 p.m.	<b>K. Tanaka</b>	B meson light-cone wavefunctions in the heavy quark limit
2.50 p.m. – 3.00 p.m.		Discussion
3.00 p.m. – 3.20 p.m.	<b>L. Reina</b>	QCD corrections to $t\bar{t}H$ production at hadron colliders
3.20 p.m. – 3.30 p.m.		Discussion
3.30 p.m. – 3.50 p.m.	<b>A. Hoang</b>	Delocalized operator expansion
3.50 p.m. – 4.00 p.m.		Discussion
4.00 p.m. – 4.30 p.m.		<b>Coffee Break</b>

Thursday, September 12: Session II

## Flavour Physics

4.30 p.m.	–	4.50 p.m.	<b>M. Misiak</b>	Charm quark loops in $B \rightarrow X_s \gamma$
4.50 p.m.	–	5.00 p.m.		Discussion
5.00 p.m.	–	5.20 p.m.	<b>T. Hurth</b>	Forward-backward asymmetry and dilepton mass spectrum of $B \rightarrow X_s l^+ l^-$
5.20 p.m.	–	5.30 p.m.		Discussion

## General Aspects

5.30 p.m.	–	5.50 p.m.	<b>D. Stöckinger</b>	Renormalization of the minimal supersymmetric standard model
5.50 p.m.	–	6.00 p.m.		Discussion
6.00 p.m.	–	6.20 p.m.	<b>Y. Schröder</b>	QCD free energy at four loops
6.20 p.m.	–	6.30 p.m.		Discussion
6.30 p.m.	–	6.50 p.m.	<b>T. Becher</b>	The asymptotic expansion of lattice loop integrals around the continuum limit
6.50 p.m.	–	7.00 p.m.		Discussion

7.30 p.m.

*Conference Dinner*

## Friday, September 13:

7.00 a.m. – 8.10 a.m.

**Breakfast**

## General Aspects

8.10 a.m. – 8.50 a.m. **M. Feindt**

A review of experiments on  $B$  physics

8.50 a.m. – 9.00 a.m.

Discussion

9.00 a.m. – 9.20 a.m. **E. Remiddi**

Analytic evaluation of Feynman graph integrals

9.20 a.m. – 9.30 a.m.

Discussion

9.30 a.m. – 9.50 a.m. **V. Smirnov**

Evaluating double and triple  $\gamma$  boxes

9.50 a.m. – 10.00 a.m.

Discussion

10.00 a.m. – 10.20 a.m. **M. Caffo**

Numerical evaluation of master integrals from differential equations

10.20 a.m. – 10.30 a.m.

Discussion

10.30 a.m. – 11.00 a.m.

**Coffee Break**

11.00 a.m. – 11.20 a.m. **A. De Freitas**

Two loop corrections to gluon fusion into two photons

11.20 a.m. – 11.30 a.m.

Discussion

11.30 a.m. – 11.50 a.m. **Z. Bern**

Isolating a light Higgs boson from the di-photon background at the LHC

11.50 a.m. – 12.00 a.m.

Discussion

12.00 a.m. – 1.00 p.m.

**Lunch Break**

1.00 p.m. – 1.20 p.m. **J. van der Bij**

Radiative corrections in a non-standard Higgs-sector

1.20 p.m. – 1.30 p.m.

Discussion

1.30 p.m. – 1.50 p.m. **B. Ward**

Precision calculation for  $e^+e^- \rightarrow 2f$ : the KKMC project

1.50 p.m. – 2.00 p.m.

Discussion

2.00 p.m. – 2.20 p.m. **D. Broadhurst**

Where do the tedious products of  $\zeta$ 's come from?

2.20 p.m. – 2.30 p.m.

Discussion

2.30 p.m. – 3.15 p.m. **W. Marciano**

Conclusion and Outlook

3.15 p.m.

**End of the Workshop, Departure**