HIGH-ENERGY COLLIDER PARAMETERS: e^+e^- Colliders (IV)

The numbers here were received from representatives of the colliders in 1993 or early 1994. Numbers are subject to change. Quantities are, where appropriate, r.m.s. H, V, and, s.c. indicate horizontal and vertical directions, and superconducting.

	VEPP-2M	DAΦNE	ϕ FACTORY (UCLA)	ϕ FACTORY (Novosibirsk)
Physics start date	1992	1996	?	1997
Maximum beam energy (GeV)	0.7	2×0.510 (1.5 c.m. max.)	0.18×1.5	0.55
Luminosity (10^{30}cm^{-2}s^{-1})	6	135(→540)	10	1000
Time between collisions (μs)	0.03	0.0108(→0.0027)	—	0.06
Crossing angle (μ rad)	0	(1.0 to 1.5)$\times 10^4$	—	0
Energy spread (units 10^{-3})	0.6	0.40	—	0.5
Bunch length (cm)	3	3.0	—	1
Beam radius (10^{-6} m)	H: 400 V: 10	H: 2100 V: 21	—	H: 65 V: 65
Free space at interaction point (m)	±1	±0.46	—	±2
Luminosity lifetime (hr)	0.3	3.0	—	continuous
Filling time (min)	continuous	< 2 (topping up)	—	continuous
Acceleration period (s)	—	—	—	—
Injection energy (GeV)	—	0.510	—	—
Transverse emittance ($10^{-9}\pi$ rad-m)	H: 400 V: 4	H: 1000 V: 10	Lo E: H/V: 312/13 Hi E: H/V: 156/6.2	H: 400 V: 400
β^*, amplitude function at interaction point (m)	H: 0.48 V: 0.04	H: 4.5 V: 0.045	Lo E: H/V: 0.50/0.02 Hi E: H/V: 1.00/0.04	H: 0.01 V: 0.01
Beam-beam tune shift per crossing (units 10^{-4})	500	400	—	1000
RF frequency (MHz)	200	368.25	Lo E/Hi E=212/500	700
Particles per bunch (units 10^{10})	4	8.9	—	16
Bunches per ring per species	1	30(→120)	Lo E/Hi E=1/3	1
Average beam current per species (mA)	100	1313(→5250)	Lo E/Hi E=180/43	200
Circumference or length (m)	18	97.7	Lo E/Hi E=8.5/25.5	36
Interaction regions	2	2	1	1
Utility insertions	1	2×2	—	1
Magnetic length of dipole (m)	1	1.21/0.99	—	0.9
Length of standard cell (m)	4.5	—	—	9
Phase advance per cell (deg)	280	—	—	548
Dipoles in ring	8	8(+4 wigglers)	—	16
Quadrupoles in ring	20	51	—	28
Peak magnetic field (T)	1.8	1.2(→1.76) dipoles 1.8 wigglers	Lo E/Hi E=1.0/7.0	2.2