| Number   | Final-State   | Beams and types                   |
|----------|---|-----------------------------------|
| 1        | $H(5) \rightarrow b(6) + \overline{b}(7)$   | pp-el                             |
| 2        | $\gamma(6) + \gamma(7)$   | pp-el                             |
| 3        | g(6) + g(7)   | pp-el                             |
| 4        | $q(6) + \overline{q}(7)$  | pp-el                             |
| 5        | $c(6) + \overline{c}(7)$  | pp-el                             |
| 6        | $b(6) + \overline{b}(7)$  | pp-el                             |
| 7        | g(6) + g(7) + g(8)  | pp-el                             |
| 8        | $q(6) + \overline{q}(7) + g(8)$   | pp-el                             |
| 9        | $\pi^{+}(6) + \pi^{-}(7)$   | pp-el                             |
| 10       | $\pi^{0}(6) + \pi^{0}(7)$   | pp-el                             |
| 11       | $K^{+}(6) + K^{-}(7)$   | pp-el                             |
| 12       | $K_0(6) + K_0(7)$   | pp-el                             |
| 13       | $\rho_0(6) + \rho_0(7)$   | pp-el                             |
| 14       | $ \begin{array}{l} \eta(6) + \eta(7) \\ \eta(6) + \eta'(7) \end{array} $  | pp-el                             |
| 15<br>16 | $\eta'(6) + \eta'(7)$ $\eta'(6) + \eta'(7)$   | pp-el                             |
| 17       | $\begin{array}{c} \eta \ (0) + \eta \ (7) \\ \phi (6) + \phi (7) \end{array}$   | pp-el                             |
| 18       | $J/\psi(6)(\rightarrow \mu^{+}(8) + \mu^{-}(9)) + J/\psi(7)(\rightarrow \mu^{+}(10) + \mu^{-}(11))$   | pp-el                             |
| 1        | $J/\psi(0)(\to \mu^+(0) + \mu^-(0)) + J/\psi(7)(\to \mu^+(10) + \mu^-(11))$   | pp-el                             |
| 19       | $J/\psi(6)(\to \mu^+(8) + \mu^-(9)) + \psi_{2S}(7)(\to \mu^+(10) + \mu^-(11))$  | pp-el                             |
| 20       | $\psi_{2S}(6)(\to \mu^{+}(8) + \mu^{-}(9)) + \psi_{2S}(7)(\to \mu^{+}(10) + \mu^{-}(11))$   | pp-el                             |
| 21       | $\chi_{c0}(5) \to \gamma(6) + J/\psi(7)(\to \mu^{+}(8) + \mu^{-}(9))$   | pp-el                             |
| 22       | $\chi_{c1}(5) \to \gamma(6) + J/\psi(7)(\to \mu_{\perp}^{+}(8) + \mu_{\perp}^{-}(9))$   | pp-el                             |
| 23       | $\chi_{c2}(5) \to \gamma(6) + J/\psi(7)(\to \mu^{+}(8) + \mu^{-}(9))$   | pp-el                             |
| 24<br>25 | $\chi_{c0}(5) \to S(6) + S(7)$  | pp-el                             |
| 25<br>26 | $ \begin{array}{c} \chi_{C1}(5) \rightarrow S(6) + S(7) \\ \chi_{C2}(5) \rightarrow S(6) + S(7) \end{array} $   | pp-el                             |
| 27       | $\begin{array}{c} \chi_{c2}(5) \rightarrow S(6) + S(7) \\ \chi_{c1}(5) \rightarrow f(6) + \overline{f}(7) \end{array}$  | pp-el<br>pp-el                    |
| 28       | $\begin{array}{c} \chi_{c1}(5) \rightarrow f(6) + \overline{f}(7) \\ \chi_{c2}(5) \rightarrow f(6) + \overline{f}(7) \end{array}$   | pp-el $pp$ -el                    |
| 29       | $\chi_{c0}(5) \to \pi^{+}(6) + \pi^{-}(7) + \pi^{+}(8) + \pi^{-}(9)$  | pp-el                             |
| 30       | $\chi_{c1}(5) \to \pi^{+}(6) + \pi^{-}(7) + \pi^{+}(8) + \pi^{-}(9)$  | pp-el                             |
| 31       | $\chi_{c2}(5) \to \pi^{+}(6) + \pi^{-}(7) + \pi^{+}(8) + \pi^{-}(9)$  | pp-el                             |
| 32       | $\chi_{c0}(5) \to \pi^{+}(6) + \pi^{-}(7) + K^{+}(8) + K^{-}(9)$  | pp-el                             |
| 33       | $\chi_{c1}(5) \to \pi^{+}(6) + \pi^{-}(7) + K^{+}(8) + K^{-}(9)$  | pp-el                             |
| 34       | $\chi_{C2}(5) \to \pi^{+}(6) + \pi^{-}(7) + K^{+}(8) + K^{-}(9)$  | pp-el                             |
| 35       | $\chi_{c0}(5) \to 3(\pi^{+}(6, 8, 10) + \pi^{-}(7, 9, 11))$   | pp-el                             |
| 36       | $\chi_{c1}(5) \to 3(\pi^+(6,8,10) + \pi^-(7,9,11))$   |                                   |
| 37       | $\chi_{c2}(5) \to 3(\pi^+(6,8,10) + \pi^-(7,9,11))$   | pp-el                             |
| 38       | $\begin{array}{c} \chi_{c2}(5) \to 3(\pi^+(6,8,10) + \pi^-(7,9,11)) \\ \eta_{c}(5) \end{array}$   | pp-el<br>pp-el                    |
| 39       | $\chi_{b0}(5) \to \gamma(6) + \Upsilon_{1S}(7)(\to \mu^{+}(8) + \mu^{-}(9))$  | pp-el                             |
| 40       | $\chi_{b1}(5) \rightarrow \gamma(6) + \Upsilon_{1S}(7)(\rightarrow \mu^{+}(8) + \mu^{-}(9))$  | pp-el                             |
| 41       | $\chi_{b2}(5) \rightarrow \gamma(6) + \Upsilon_{1S}(7)(\rightarrow \mu^{+}(8) + \mu^{-}(9))$  | pp-el                             |
| 42       | $\chi_{b0}(5) \to S(6) + S(7)$  | pp-el<br>pp-el                    |
| 43       | $X(6) + Z(7) (\rightarrow e^{+}(8) + e^{-}(9))$   | pp-el                             |
| 44       | $\chi_{b2}(5) \rightarrow S(6) + S(7)$  | pp-el                             |
| 45       | $\chi_{b1}(5) \rightarrow f(6) + \overline{f}(7)$   | pp-el                             |
| 46       | $\chi_{h2}(5) \rightarrow f(6) + \overline{f}(7)$   | pp-el                             |
| 47       | $\eta_b(5)$   | pp-el                             |
| 48       | $\rho_0(5) \to \pi^+(6)\pi^-(7)$  | pp-el                             |
| 49       | $\phi(5) \to K^{+}(6)K^{-}(7)$  | pp-el                             |
| 50       | $J/\psi(5) \to \mu^{+}(6)\mu^{-}(7)$  | pp-el                             |
| 51       | $\Upsilon_{1S}(5) \to \mu^{+}(6)\mu^{-}(7)$   | pp-el                             |
| 52       | $\psi_{2S}^{1S}(5) \to \mu^{+}(6)\mu^{-}(7)$  | pp-el                             |
| 53       | $\psi_{2S}^{-}(5) \to J/\psi(6)(\to \mu^{+}(9) + \mu^{-}(10)) + \pi^{+}(7) + \pi^{-}(8)$  | pp-el                             |
| 54       | Not documented  |                                   |
| 55       | $W^{+}(\to \nu_{l}(8) + l^{+}(9)) + W^{-}(\to \overline{\nu}_{l}(10) + l^{-}(11))$  | AA-el $pp$ -dd $pp$ -sda $pp$ -el |
| 56       | $e^{+}(6) + e^{-}(7)$   | AA-el $pp$ -dd $pp$ -sda $pp$ -el |
| 57       | $\mu_{+}^{+}(6) + \mu_{-}^{-}(7)$   | AA-el $pp$ -dd $pp$ -sda $pp$ -el |
| 58       | $\tau^{+}(6) + \tau^{-}(7)$   | AA-el $pp$ -dd $pp$ -sda $pp$ -el |
| 59       | $\gamma(6) + \gamma(7)$   | AA-el pp-el                       |
| 60<br>61 | $H(5) 	o b(6) + \overline{b}(6)$ Not documented   | AA-el pp-el                       |
| 68       | Not documented $a(5) \rightarrow \gamma(6) + \gamma(7)$   | AA-el pp-dd pp-sda pp-el          |
| 69       | $M(5) \rightarrow \gamma(6) + \gamma(7)$ (Dirac Coupling)   | AA-el pp-el                       |
| 70       | $M(5) \rightarrow \gamma(6) + \gamma(7) \ (\beta g \ \text{Coupling})$  | AA-el pp-el                       |
| 71       | $m(6) + \overline{m}(7)$ (Dirac Coupling)   | AA-el pp-el                       |
| 72       | $m(6) + \overline{m}(7) (\beta g \text{ Coupling})$   | AA-el pp-el                       |
| 73       | $\tilde{\chi}^{-}(6)(\to \tilde{\chi}_{0}^{1}(8) + \mu^{-}(9) + \overline{\nu}_{\mu}(10)) + \tilde{\chi}^{+}(7)(\to \tilde{\chi}_{0}^{1}(11) + \mu^{+}(12) + \nu_{\mu}(13))$  | AA-el pp-el                       |
| 74       | $\begin{array}{c} \vec{\chi} - (6)(-) \vec{\chi}_0^1(8) + \vec{u}(9) + \vec{d}(10)) + \vec{\chi}_1^+(7)(-) \vec{\chi}_0^1(11) + u(12) + \vec{d}(13)) \\ \vec{\chi} - (6)(-) \vec{\chi}_0^1(8) + \mu^-(9) + \vec{\nu}_\mu(10)) + \vec{\chi}_1^+(7)(-) \vec{\chi}_0^1(11) + u(12) + \vec{d}(13)) \\ \vec{l}^-(5)(-) \vec{\chi}_0^1(8) + \mu^-(9)) + \vec{l}^+(6)(-) \vec{\chi}_0^1(10) + \mu^+(11)) \\ \vec{l}^-(5)(-) \vec{\chi}_0^1(8) + \mu^-(9)) + \vec{l}^+(6)(-) \vec{\chi}_0^1(10) + \mu^+(11)) \end{array}$ | AA-el pp-el                       |
| 75       | $\tilde{\chi}^{-}(6)(\to \tilde{\chi}_{0}^{1}(8) + \mu^{-}(9) + \overline{\nu}_{\mu}(10)) + \tilde{\chi}_{-}^{+}(7)(\to \tilde{\chi}_{0}^{1}(11) + u(12) + \overline{d}(13))$   | AA-el pp-el                       |
| 76       | $\tilde{l}^{-}(5)(\to \tilde{\chi}_{0}^{1}(8) + \mu^{-}(9)) + \tilde{l}^{+}(6)(\to \tilde{\chi}_{0}^{1}(10) + \mu^{+}(11))$   | AA-el pp-el                       |
| 77       | $\phi(5) \rightarrow \mu^+(6)\mu^-(7)$  | pp-el                             |
| 78       | $J/\psi(5) \to e^{+}(6)e^{-}(7)$  | pp-el                             |
| 79       | $\psi_{2S}(5) \to e^{+}(6)e^{-}(7)$   | pp-el                             |
| 82       | $X(6) + \gamma(7)$  | pp-el                             |
| 83       | $X(6) + Z(7) (\rightarrow \mu^{+}(8) + \mu^{-}(9))$   | pp-el                             |
| 84       | Not documented  | pp-el                             |